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FINAL ENVIRONMENTAL IMPACT STATEMENT

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OZAN CREEKS
WATERSHED

Hempstead County, Arkansas



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



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OZAN CREEKS WATERSHED
Hempstead County, Arkansas

FINAL ENVIRONMENTAL IMPACT STATEMENT

M. J. Spears, State Conservationist
Soil Conservation Service

Sponsoring Local Organization

Hempstead County Soil and Water Conservation District
Hope, Arkansas 71801

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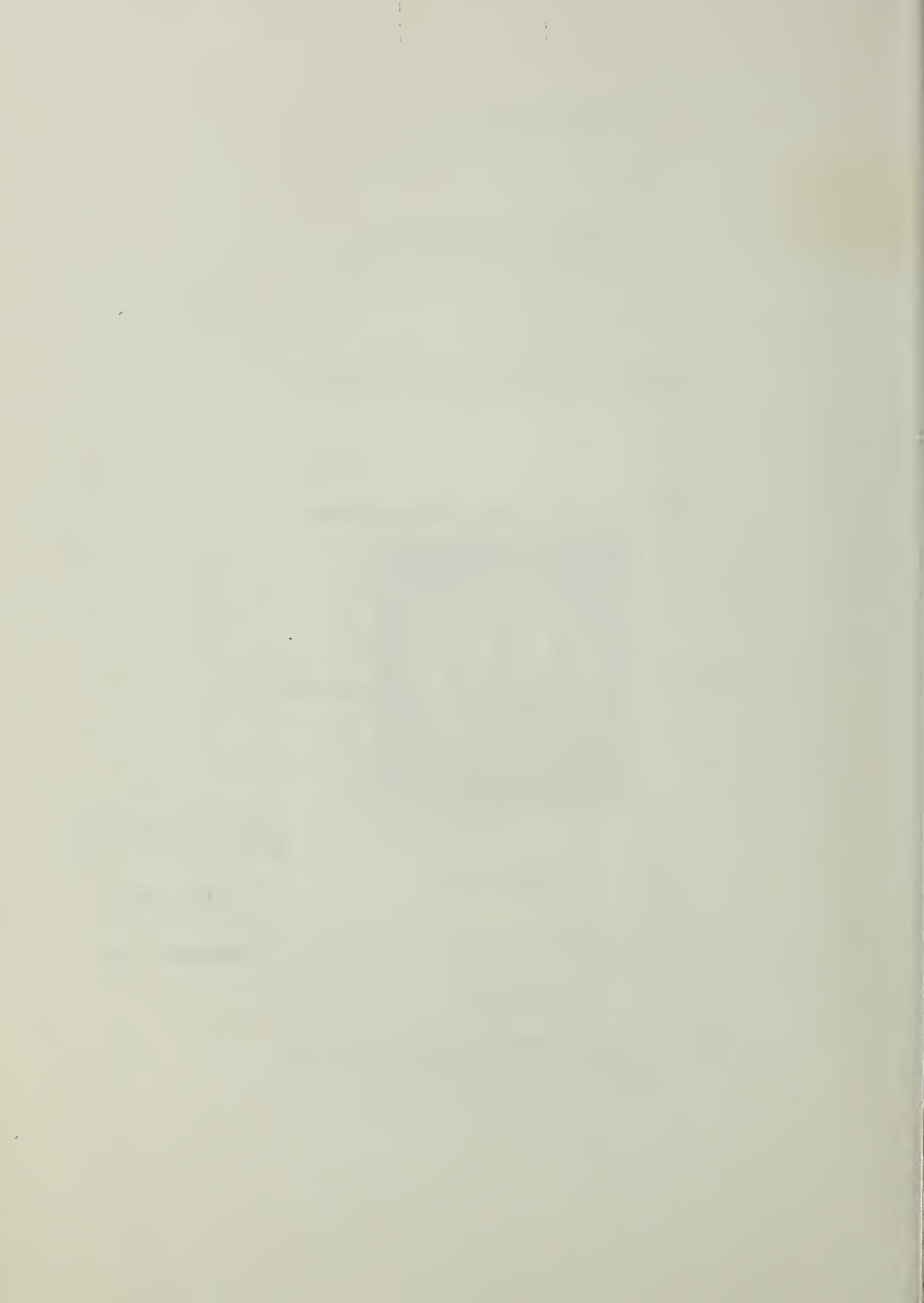
August 1975

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CATALOGING - PREP.

PREPARED BY

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Little Rock, Arkansas 72203



II. USDA ENVIRONMENTAL IMPACT STATEMENT

Ozan Creeks Watershed
Hempstead County, Arkansas

Prepared in Accordance with Section 102(2)(C) of Public Law 91-190

Summary Sheet

- I. Final.
- II. Soil Conservation Service.
- III. Administrative.
- IV. Description of Project Purpose and Action.

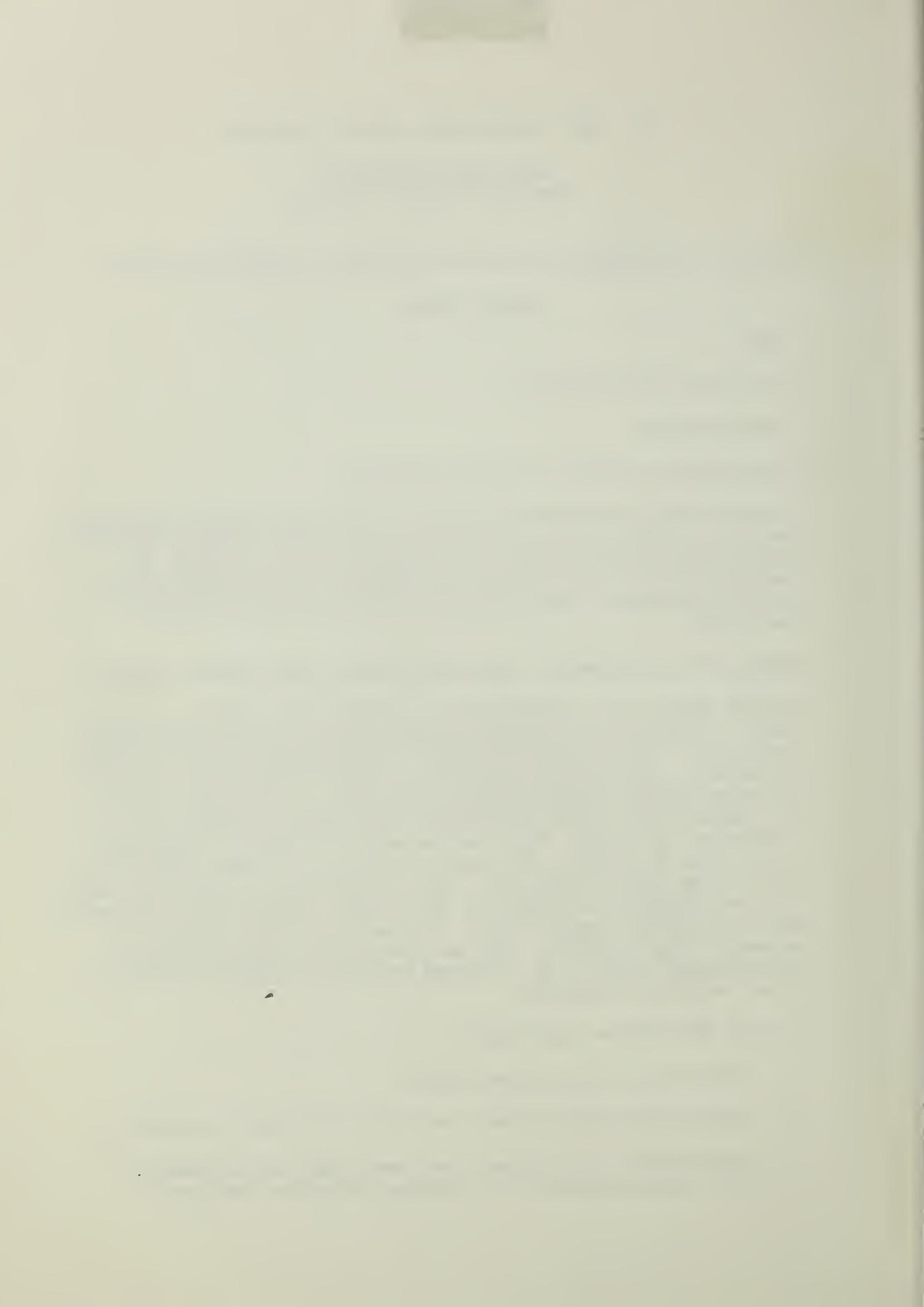
The Ozan Creeks Watershed Project is in Hempstead County, Arkansas, and will provide watershed protection and flood prevention by the application of conservation land treatment measures and by the installation of land stabilization measures and 22 floodwater retarding structures, implemented under the provisions of Public Law 83-566.

V. Summary of Environmental Impact and Adverse Environmental Effects.

Average annual acres flooded will be reduced 25 percent on 11,426 acres. Floodwater and sediment damages will be reduced 32 percent. Erosion will be reduced 17 percent. Sediment yield will be reduced 43 percent. Stream pollution will be reduced 44 percent. Bridge and road damages will be reduced 25 percent. Fishery habitat will be created in 664 acres of reservoir and wildlife habitat will be created on 437 acres. Water for perennial flow will be augmented on 52 miles of channel. The general economy and living conditions of the area will be improved. The structures will require 856 acres that are presently in grassland (536 acres), forest land (301 acres), and cropland (19 acres). About 14 miles of natural streams with ephemeral flow conditions will be converted to reservoir areas. Archeological sites at 24 locations will be affected by the floodwater retarding structures.

List of Alternatives Considered.

1. Conservation land treatment only.
2. Conservation land treatment and land stabilization measures.
3. Conservation land treatment and land stabilization measures with alternate system of floodwater retarding structures.



4. Conservation land treatment and land stabilization measures, floodwater retarding structures, and floodway.
5. Conservation land treatment and land stabilization measures, floodwater retarding structures, and channel enlargement.
6. No project action.

VII. Comments on the draft statement were received from the following agencies.

- Department of the Army
- Department of Health, Education, and Welfare
- Department of the Interior
- Department of Transportation
- Farmers Home Administration
- Environmental Protection Agency
- Advisory Council on Historic Preservation
- Arkansas Department of Planning, State Planning and Development Clearinghouse

VIII. Draft Statement transmitted to CEQ on December 23, 1974.

III. PROJECT IDENTIFICATION AND ENVIRONMENTAL SETTING

USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT 1/

FOR

A. OZAN CREEKS WATERSHED, ARKANSAS

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

B. SPONSORING LOCAL ORGANIZATION

Hempstead County Soil and Water Conservation District, Hope, Arkansas 71801.

C. PROJECT PURPOSES.

1. Watershed Protection (Conservation Land Treatment)

The goals of conservation land treatment by the sponsor and the Soil Conservation Service are to use each acre of land within its capability and treat it according to its needs. The land treatment measures included in the project will be installed by landowners and operators under the present program but with accelerated technical assistance. Proper land use and treatment are particularly important in this watershed because of the highly erodible soils. Adequate treatment is planned on practically all of the cropland and, when installed, will reduce soil erosion losses to tolerable limits.

During the installation period, nearly all of the pasture and hayland will receive some conservation land treatment measures. The goal is to adequately treat with all needed measures at least 80 percent or about 22,000 acres of the pasture and hayland.

The Arkansas Forestry Commission in cooperation with the U. S. Forest Service will continue forest fire protection for all forest lands in the watershed. About 30 percent, or 6,100 acres, of non-industrial forest lands will receive all needed treatment to control runoff and erosion.

1/ All information and data, except as otherwise noted, were collected during watershed planning investigation by the Soil Conservation Service and Forest Service, U. S. Department of Agriculture. /

2. Flood Prevention

Flood prevention on the 11,426-acre flood plain will allow more efficient and intensive use of the farmland. Flooding will continue to occur and the larger the flood, the less effect the project will have on flood reduction; however, the depth and duration of flooding on the entire flood plain will be reduced for all floods.

The following tabulation shows the area presently flooded and the area that will be flooded with the project for three flood frequencies for each reach.

Flood Frequency (average)	:	Reach	:	Present (acres)	With Project (acres)	:	Reduction (percent)
Two times per year		I		3,425	3,215		6
		II		415	150		64
		III		643	209		67
		IV		1,500	1,405		6
TOTAL				5,983	4,979		17
One time per two years		I		3,832	3,650		5
		II		1,078	461		57
		III		1,468	654		55
		IV		1,648	1,615		2
TOTAL				8,026	6,380		21
One time per ten years		I		4,402	4,205		4
		II		1,623	1,276		21
		III		2,562	2,033		21
		IV		1,666	1,666		0
TOTAL				10,253	9,180		10

About 200 acres will be protected from land voiding during the life of the project.

3. Fish and Wildlife

Goals in preserving, improving, and developing fish and wildlife habitat will be achieved by storage and low-flow release features of the structures, land treatment measures including farm ponds, and revegetation of critically eroding and disturbed areas.

4. Critical Area Treatment

About 250 acres of critically eroding land will be treated by project structural and vegetative measures to reduce the average erosion rate from 39 tons per acre to 3 tons per acre and to develop desirable wildlife habitat.

D. PLANNED PROJECT

1. Land Treatment Measures

The Hempstead County Soil and Water Conservation District has been conducting a conservation program on the farms in the watershed for several years. This program is based on the use of each acre of land within its capability and its treatment in accordance with its needs and is an essential part of the watershed protection. Land treatment measures included in the project will continue to be installed by landowners and operators under the present program but with accelerated technical assistance. All land in the watershed will be subject to the application of land treatment measures.

About 9,000 acres of cropland will be adequately treated with conservation measures. In the upland areas of the watershed the trend has been to plant grass or trees on sloping cultivated land that is subject to excessive erosion. This trend is expected to continue and steep land presently used for cropland will be established in permanent vegetative cover. Landowners have indicated that they will convert some of the grassland to cropland in the flood plain after the flood prevention measures are installed. Land treatment measures, including conservation cropping systems, fertilizing, liming, proper tillage, and crop residue management, will be applied on all cropland to help control erosion and promote good land management. Cropping systems will include the use of cover and green manure crops and rotation of hay and pasture where the regular crops will not produce adequate residue to provide protective cover to control erosion and to maintain good physical condition of the soil. Existing terrace systems will be maintained or reworked and new systems will be constructed where needed. Sloping hill land will be contour cultivated. On the wet bottom land soils, mains, laterals, field drains, and grade stabilization structures will be installed by landowners to remove excess surface water for crop production.

Pasture and hayland on about 22,000 acres will be adequately treated by proper management, including brush management, weed control, fertilizing, liming, proper grazing use, renovating, and seeding additional grasses and legumes. About 4,800 acres of native pasture, low-grade hardwood, and cropland will be seeded to pasture and hayland. The

principal grasses that will be planted are bermudagrass, bahiagrass, and tall fescue. The vegetative cover on 6,900 acres of native grassland will be improved and forage production will be increased by proper grazing use, brush management, and weed control.

About 45 farm ponds will be constructed to provide water for live-stock and to encourage proper distribution of grazing.

Landowners and operators will be encouraged to manage many odd areas and wetland areas as wildlife habitat. These areas will be protected from fire and harmful grazing. Specific wildlife species will be favored depending on the type of habitat. Trees and other herbaceous species especially valuable to wildlife will be favored. Other areas will be planted to herbaceous and woody plants that are specifically selected for their value to wildlife. Most of the farm ponds that will be built during project installation will be stocked with fish for sport fishing.

The forest land treatment program was developed from information acquired during a field survey of the watershed, from subsequent co-ordination with the Arkansas Forestry Commission, and from land use recommendations by the Soil Conservation Service. This program is based on the needs beyond those met by the existing cooperative federal-state forestry programs. The goals are realistic and can be met during the 5-year installation period.

The forest land treatment measures are designed to reduce runoff and erosion. Proper forest management and protection will accelerate the development of humus, which will increase infiltration and storage of water. Humus-building tree species, game food species, and den trees favored during cutting operations and interplanting will develop well-aggregated soils and accelerate the development of a varied and productive wildlife habitat. Landowners having forest land will be encouraged to apply and maintain forestry measures on their forested lands. The U. S. Forest Service, by and through the Arkansas Forestry Commission, will provide technical assistance in the planning and application of forest land treatment measures on the watershed under the going Cooperative Forest Management Program. This will provide additional technical assistance for accelerating the installation of forestry measures. A forester trained in watershed management will be assigned to this project to guide and assist the landowners in the installation of planned forestry measures.

Accelerated technical assistance to the landowners will result in more effective forestry practices on more forest lands. These forest lands will be developed in harmony with sound watershed management for wildlife, recreation, timber, and other environmental needs.

The Hempstead County Soil and Water Conservation District, the Arkansas Forestry Commission, and the International Paper Company will jointly

develop a forest land treatment program that will effectively establish and maintain optimal forest productivity and diversity.

The planned forest land treatment measures include about 1,900 acres of tree planting, about 4,200 acres of stand improvement treatment, and continued fire prevention measures on all forested lands.

1. Tree Planting - Watershed Protection (1,900 acres)

Reforestation of 1,900 acres of understocked stands is needed to adjust land use to its capability and to reduce runoff and erosion by improving the protective forest canopy and the absorbent forest floor. Tree planting will not be performed unless the tract is protected from grazing.

2. Stand Improvement Measures (4,200 acres)

Timber stand improvement includes silvicultural measures designed to improve hydrologic capabilities of forests by adjusting the stand composition to that which will produce optimum development and protection of forest cover, litter, and humus. These practices include improvement cuttings, tree release, and cull removal.

2. Structural Measures

Structural measures consist of 22 floodwater retarding structures and about 250 acres of land stabilization measures. The total drainage area above the proposed structures is 22.75 square miles, which is 23 percent of the watershed. The structure locations are shown on the map in Appendix B.

All floodwater retarding structures provide for 100-year sediment storage. Because of physical limitations, the principal spillway crests of Structures Numbers 1 through 6 and 21 were set at the 100-year submerged sediment elevation with ungated ports at the 50-year sediment elevations. The principal spillway crests of the remaining structures were raised to provide additional storage to be released through ungated ports at the 100-year sediment elevations. The augmentation flow will mitigate the adverse effect of downstream fishery. In addition, the augmentation flow will help control channel degradation by maintaining a wet-bottom channel where the channels traverse the Marlbrook Marl Formation.

The floodwater retarding structures will provide storage for 2,164 acre-feet of submerged sediment, 94 acre-feet of aerated sediment, 1,000 acre-feet of water for low-flow augmentation, and 8,032 acre-feet of floodwater detention storage. The pools at the crests of the principal spillways will inundate 664 acres. Of this area, 227 acres between the ungated port levels and the principal spillway levels will be inundated periodically. The area below the ungated ports (437 acres) will be permanently inundated except during drawdown for fish and wildlife management. The

floodwater detention pools above the principal spillways will temporarily inundate 835 acres. Floodwater detention capacities vary from 4.95 to 8.33 inches of runoff from the drainage areas above the structures.

Principal spillways of the structures will be reinforced concrete. Floodwater Retarding Structures Numbers 1, 4, 10, 20, and 21 will have single-stage inlets. All others will have two-stage inlets that will provide storage for runoff from a 5-year, 1-day rain between the high and low stages.

Principal spillways will be constructed on yielding foundations of clay soils overlying marl, shale, and chalk at moderate depths.

All dams will be earthfill structures with vegetated emergency spillways to convey runoff exceeding reservoir storage capacity safely past the embankment. The chance of these spillways operating will be less than once in 25 years on the average. The earthfills will be essentially homogeneous clay with moderate to high plasticity. Borrow material will be obtained from the sediment pools. This material is residual clay soil developed from marl, chalk, and shale of Cretaceous age. All earthfills and emergency spillways will be fenced to control grazing.

Each structure will have a drain valve in the principal spillway to facilitate construction or repair and a mid-level gate to provide for fish and wildlife management practices.

Trees and shrubs for controlling erosion, preserving wildlife habitat, screening objectionable views, exposing desirable views, and blending structures with the surroundings will be considered in selecting areas to be cleared. Areas disturbed during construction will be promptly revegetated for erosion control and wildlife habitat. Approximately 105 acres of forest land will be retained in the upper one-third of permanent pools and at points where feeder streams enter the pools. This measure will provide shelter and increase fish food production.

The present land uses of the proposed sites of the embankments and emergency spillways and the submerged sediment and low-flow augmentation pools are as follows:

Sites	Land Use				Total
	Grassland	Woodland	Cropland	acres	
Embankments and Emergency Spillways	138	53	1	192	
Submerged Sediment and Low-Flow Augmentation Pools	398	248	18	664	
TOTAL	536	301	19	856	

The land that will be committed to the project is privately owned and ownership will not change as a result of the project.

During project installation, all federal, state, and local health, safety, and air and water pollution regulations will be followed. Cleared material will be piled and burned, and any unburned material will be buried. Burning and disposal of debris will be in accordance with all applicable regulations.

The following actions will be taken to control erosion and pollution:

1. Sprinkling will be used to keep dust within acceptable limits.
2. Sanitary facilities will not be located over, or adjacent to, live streams or springs.
3. Measures will be provided at equipment storage and repair areas to prevent contaminants from reaching streams and ground water.
4. The following erosion and sediment control measures will be applied, as needed, to minimize stream turbidity at and below structures.
 - a. Diversions, waterways, and terraces will be used to retard the rate of runoff and control erosion from the construction site.
 - b. Debris basins will be used to minimize sediment resulting from construction and dewatering operations.
 - c. Clearing and grubbing of construction sites and borrow areas will occur in stages as construction progresses.
 - d. Temporary vegetation and/or mulching will be used to protect the soils. Segments of work will be completed and protected as rapidly as is consistent with construction schedules.

- e. Conduits or bridges will be installed where construction activities cross flowing streams.

5. Prior to construction, areas will be designated for the disposal of waste material.

Noise from the equipment used during construction cannot be avoided; however, the contractor will keep his equipment in a state of good repair to insure that noise will be held to a minimum. The structures are located in remote areas away from any concentrations of population and the noise problem will be minimal.

Dust is not expected to be a problem but it will be kept within tolerable limits by sprinkling, application of dust suppressors, or by other appropriate means.

Vectors should not be a problem because of the remoteness of the structure sites. However, practices to prevent and reduce mosquito and other aquatic insect breeding sites include the following:

1. All borrow pits and other potential ponding areas associated with construction of the dam and relocation of roads that are located above the maximum pool level will be made self-draining.
2. Prior to impoundage, borrow pits and depressions that will be flooded by the reservoirs at maximum pool levels and would retain water at lower pool levels will be provided with drains to insure complete drainage of water within them.

Floodwater Retarding Structures Numbers 1, 3, 4, 6, 10, 11, 12, and 13 are located near existing public roads and have potential for incidental recreation. Floodwater Retarding Structures Numbers 2, 5, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 21, and 22 have little potential for incidental recreation because of their remote location or size. The sponsor will not provide public access to any of the sites.

A total of 24 sites were located in the reservoir areas during the archeological survey (13). These sites are located at Floodwater Retarding Structures Numbers 1, 6, 7, 9, 10, 11, 12, 14, 16, and 21. Structure Number 22 was not surveyed because survey access was denied by the landowner. The following table lists the archeological sites located at each floodwater retarding structure.

Floodwater Retarding Structure Numbers	:	:	Located in Sediment Pool	Located in Flood Pool
1		3HE 132		X
6		3HE 129	X	
		3HE 130	X	
		3HE 131	X	
7		3HE 124	X	
		3HE 125	X	
9		3HE 127	X	
10		3HE 119	X	
		3HE 120	X	
		3HE 121		X
11		3HE 133	X	
		3HE 134	X	
		3HE 135	X	
12		3HE 136	X	
14		3HE 122	X	
		3HE 137	X	
		3HE 138	X	
		3HE 139	X	
		3HE 140	X	
16		3HE 115	X	
		3HE 116	X	
		3HE 117	X	
		3HE 128		X
21		3HE 126	X	
22		(Not Surveyed)		
Total			21	3

The 24 archeological sites listed above will be affected by installation of the project, according to the report of the Arkansas Archeological Survey. The Arkansas Archeological Survey will be requested to make an additional investigation after clearing operations have been completed. Recovery, protection, or preservation of the sites will be performed in accordance with the Archeological and Historical Preservation Act (PL 92-291). The National Park Service will be notified if any previously unidentified evidence of cultural values are discovered during detailed investigations or construction and the procedures in PL 93-291 will be followed. Since this is a federally assisted land project, there is no change in the existing responsibilities of any federal agency under Executive Order 11593 with respect to archeological and historical resources.

Land stabilization measures will be installed on about 250 acres of critically eroded land. About 77 acres along eroding streams will be shaped to stabilize slopes and grade stabilization structures will be installed. Most of the 173 acres of eroding chalky upland areas will need mechanical measures for erosion control but some will need only revegetation. All land that is critically eroded or disturbed during construction will be vegetated for erosion control, wildlife habitat, and aesthetic values and will be fertilized with poultry litter and mulched. These areas will be fenced to control grazing by domestic livestock.

The installation of structural measures will require moving 1 1/2 miles of county roads, 1/2 mile of telephone line, and 1/2 mile of power line.

3. Operation and Maintenance

The landowners and operators will maintain the land treatment measures under agreements with the Hempstead County Soil and Water Conservation District.

The Arkansas Forestry Commission, in cooperation with the U. S. Forest Service, will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program. They will also continue to furnish fire protection under the Cooperative Forest Fire Control program. Representatives of the Hempstead County Soil and Water Conservation District and the Soil Conservation Service will make periodic inspections of land treatment measures and the district will encourage farmers to perform needed maintenance.

The structural measures will be operated and maintained by the Ozan Creeks Improvement Project Area of the Hempstead County Soil and Water Conservation District at an estimated annual cost of \$2,950. Funds for paying costs of maintaining the floodwater retarding structures

and land stabilization measures will be obtained from taxes levied on the benefited area. Maintenance will be performed with contributed labor, district-owned equipment, by contract or force account, or a combination of these methods.

Provision will be made for free access for representatives of the sponsoring local organization and federal agencies to inspect works of improvement and for the sponsor to provide maintenance for the structural measures at any time.

All work will meet the requirements of Act 81, of the Arkansas General Assembly of 1957, as amended, which authorizes the Division of Soil and Water Resources to issue permits for construction of dams, inspect construction, and make annual operation and maintenance inspections after construction. The sponsor will be required to follow the Division's recommendations on needed maintenance work.

For the first three years after the structural measures are installed, the Soil Conservation Service and the sponsor will make a joint inspection annually, after unusually severe floods, and after the occurrence of any other unusual conditions which might adversely affect the structural measures. Inspection after the third year will be made annually by the sponsor.

Annual maintenance will be needed to maintain an adequate vegetative cover on earthfills, emergency spillways, and borrow areas. During the life of the structure, it may be necessary to do major repair work to restore concrete that has deteriorated; replace gates, trash racks, or other metal works; remove and/or stabilize slide material; and replace eroded material and revegetate the emergency spillways. Fences will be maintained until there is mutual agreement that they are no longer needed to protect structural works of improvement.

An operation and maintenance agreement will be executed prior to signing a project agreement. This operation and maintenance agreement will contain a reference to the Soil Conservation Service publication, "State of Arkansas Watersheds Operation and Maintenance Handbook," and a plan for operation and maintenance of the structural measures will be prepared.

The sponsoring local organization will maintain a record of all maintenance inspections and maintenance performed and have the record available for review by the Soil Conservation Service. The sponsor fully understands its obligations for maintenance and will execute specific maintenance agreements prior to the issuance of invitations to bid on the construction of structural measures.

4. Project Costs

The estimated project installation costs distributed to Public Law 566 and other funds are shown in the following table:

Installation Cost Item	Funds		
	Public Law 566	Other	Total
----- -dollars-----			
Structural Measures			
Construction			
Floodwater Retarding			
Structures	2,296,500	-	2,296,500
Land Stabilization	148,300	-	148,300
Other	638,800	466,700	1,105,500
Total Structural Measures	3,083,600	466,700	3,550,300
Land Treatment	57,750	596,550	654,300
Total Project	3,141,350	1,063,250	4,204,600

The benefit-cost ratio is 1.3 to 1.

E. ENVIRONMENTAL SETTING

1. Physical Resources

The 63,618-acre watershed is in Hempstead County in southwest Arkansas. The towns of Ozan (population 134), McCaskill (population 58), and Blevins (population 265) are in the watershed. Hope, the county seat, has a population of 8,830 and is 12 miles south of the watershed (8). Most of the population in the watershed is rural.

The watershed is in the Lower Mississippi Water Resource Region (11) which is mostly flat alluvial and coastal plains and undulating loessial areas. Elevations range from sea level to 2,800 feet with most of the region below 400 feet (9). The alluvial areas are used for agricultural production and the other areas for forest production. This watershed is not typical of the region.

The watershed is in the Ouachita Water Resource Subregion (11), which is about 80 percent pine forested Southern Coastal Plain, 15 percent hardwood-pine forested Ouachita Mountains, and 5 percent Texas Blackland Prairie. About two-thirds of the watershed is in the Texas Blackland Prairie and one-third is in the Southern Coastal Plain.

Flood damage to crops and pastures on 11,426 acres of flood plain is the major resource problem in the watershed. Improper land use and management, critical erosion on 250 acres of land, and channel erosion in the chalk and marl formations are secondary soil and water resource problems.

Most of the upland soils were formed from chalk and marl and range from shallow to deep, slowly to very slowly permeable, poorly to well drained, acid to alkaline, and calcareous, clay soils. Other upland soils were formed from coastal plain sediment and range from poorly to well drained, slowly to moderately permeable, deep, acid, loam and clay soils. The flood plain soils are poorly to somewhat poorly drained, very slowly permeable, alkaline and acid clay, and silty clay soils.

The land capability classes and subclasses of the soils in the watershed are as follows:

<u>Class & Subclass 1/</u>	<u>Acres</u>	<u>Percent</u>
IIe	1,130	2
IIw	2,559	4
IIIe	6,320	10
IIIw	4,018	6
IVe	31,990	50
IVw	8,850	14
Vw	2,007	3
VIe	<u>6,744</u>	<u>11</u>
TOTAL	63,618	100

1/ Refer to Land Capability Classification, USDA, SCS, Agricultural Handbook No. 210, September 1961, for a complete description of land capabilities.

Briefly, the land capability class (the Roman Numerals) is an interpretation of the suitability of the soil for agriculture and the subclass (the lower case letters) indicate the most limiting factor in the use of the soil. Class II soils have slight limitations; Class III soils have moderate limitations; and Class IV soils have severe limitations for crop production. Soils in Classes V and VI should remain in permanent vegetation such as pasture, hay, or forest. Subclass "e" indicates a potential erosion hazard because of the nature of the soil or the steepness of the slope. Subclass "w" indicates a limitation in use because of excess water either as overflow of floodwater, ponded surface water, poor internal drainage, a shallow water table; or combinations of these factors. Capability classifications can change if the limiting factor is corrected. For example, if /

flooding is controlled on a Class IVw soil that is frequently flooded, the capability could change to Class IIIw, Class IIw, or even Class I, depending upon the degree of flood control and other factors.

The land capability classes and subclasses of the soils in the flood plain are as follows:

<u>Class & Subclass</u>	<u>Acres</u>	<u>Percent</u>
IIw	2,559	22
IIIw	6,010	53
IVw	850	7
Vw	<u>2,007</u>	<u>18</u>
TOTAL	<u>11,426</u>	<u>100</u>

The upland part of the watershed is in the Texas Blackland Prairie Land Resource Area (9). Geologic formations underlying the watershed are marl, marly sand, and chalk of Upper Cretaceous age (3). The cuesta and valley topography is the result of a slight dip of the bedrock toward the southeast and variations in erosional resistance. Terraces of Pleistocene sand and gravel are in the Southern Coastal Plain Land Resource Area and cover the bedrock in some places in the northern part of the watershed. The southern part of the watershed has 250 acres of critically eroding soils developed from the Marlbrook Marl and Saratoga Chalk Formations.

The topography of the watershed varies from relatively flat flood plains to rolling hills. Elevations range from 280 to 490 feet above mean sea level. The terrain includes east-northeast trending cuestas and the parallel valleys of South Fork and Middle Fork Creeks.

The average annual rainfall at Hope is 51.68 inches. A maximum annual recorded rainfall of 72.58 inches occurred in 1945. Average monthly rainfall is as follows:

<u>Month</u>	<u>Inches</u>	<u>Month</u>	<u>Inches</u>
January	5.21	July	4.09
February	4.46	August	3.26
March	5.01	September	2.93
April	5.60	October	3.17
May	5.16	November	4.57
June	3.76	December	4.46

Mean temperatures range from 43.7 degrees Fahrenheit in January to 82.0 degrees Fahrenheit in August. The minimum and maximum recorded temperatures have been minus 10 degrees Fahrenheit and 115 degrees Fahrenheit. The normal frost-free period of 231 days is from March 21 to November 7 (10).

Mineral resources in the watershed include clay, shale, chalk, marl, greensand, sand and gravel, and ilmenite (6).

Clay deposits, associated with shale in the northwest part of the watershed, are suitable for making brick and tile. Shale in the same vicinity is suitable for haydite, a bloated lightweight aggregate suitable for construction. Chalk and marl are abundant in the thick beds of Cretaceous formations throughout the watershed and have potential values for use in cement and agriculture. The southeast corner of the watershed has large amounts of noncommercial (2.21 to 4.53 percent potash) glauconite-bearing greensand in the Nacatoch Sand. Sand and gravel from the northeast part of the watershed are used for roadstone, concrete aggregate, and cement silica. Sparse, noncommercial amounts of ilmenite, the principal titanium ore, have been found in the northwest corner of the watershed. No significant mining of minerals has occurred in the watershed.

Groundwater is one of the most important natural resources in the watershed. The most productive water-bearing aquifers in the watershed are the Tokio Formation and the Nacatoch Sand. Both yield moderate supplies of water for domestic use. Quaternary alluvium and terrace deposits supply moderate yields of hard water (2).

About 57 percent of the watershed and 78 percent of the flood plain are used for agricultural production.

The present land use in the watershed is as follows:

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland	9,013	14
Pasture and Hayland	27,200	43
Forest Land	25,953	41
Other Land	<u>1,452</u>	<u>2</u>
TOTAL	<u>63,618</u>	<u>100</u>

The present land use in the flood plain is as follows:

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland	6,800	60
Pasture and Hayland	2,007	18
Forest Land	2,319	20
Other Land	<u>300</u>	<u>2</u>
TOTAL	<u>11,426</u>	<u>100</u>

Except for 5,000 acres owned by International Paper Company and several other large privately owned areas, the forest occurs as small, scattered ownerships in the rolling upland portion of the watershed. Species composition of the upland forests on the Southern Coastal Plain and Texas Blackland Prairie soils are primarily loblolly pine, southern red oak, post oak, eastern red cedar, and hickory. The 2,319 acres of forest in the flood plain are mainly in Reaches I and IV and consist of willow oak, water oak, white oak, red oak, blackgum, hickory, red maple, and bald cypress. The forest land in the upper reaches of the flood plain along drainage channels is mainly sweetgum, willow, and cottonwood.

Over two-thirds of the forest land is in small farm holdings and few of these tracts have any forest management; however, International Paper Company has proper timber management on 5,000 acres in the northeastern part of the watershed. These commercial woodlands are managed primarily for softwood cellulose production. No state or national forest lands are in the watershed.

On the small privately owned woodland tracts, the hydrologic conditions of the forest soils are generally poor to very poor; the silvicultural conditions are only fair. These deteriorated woodlands are the result of past destructive logging practices, indiscriminate burning, grazing, and neglect. Site capabilities are greater than the present forest land conditions indicate. Accelerated forest management efforts in the watershed should change the hydrologic condition from very poor to fair and increase the annual production of merchantable forest products.

While the hydrologic condition of the forest floor of the commercial forest lands is poor, silvicultural aspects are generally good. The present rate of improvement on these forest lands should continue.

South Fork of Ozan Creek, Middle Fork of Ozan Creek, and Ozan Creek are the major watercourses in the watershed. South Fork and Middle Fork originate in the western part of the watershed and flow eastward about 10 miles to where they combine with North Fork and form Ozan Creek. About 8 miles farther east, Ozan Creek flows into the Little Missouri River at the watershed outlet. North Fork of Ozan creek is an authorized Public Law 566 watershed currently under construction and was considered to be in place when this project was formulated and evaluated. About 87 percent of the South Fork and 50 percent of the Middle Fork were replaced with manmade ditches between 1920 and 1930 by local interests. Ozan Creek was realigned at 20 locations in 1956 by excavating between sharp meanders of the natural channel by the U.S. Army Corps of Engineers. This increased the capacity of the creek to carry floodwater.

The present types of channel and types of flow of all streams (in reaches beginning at outlet) downstream from the structures in the watershed are as follows:

<u>Stream</u>	<u>Type of Channel</u>	<u>Type of Flow</u>	<u>Miles</u>
Ozan Creek	Natural	Perennial	.69
Ozan Creek	Manmade (1965)	Perennial	.05
Ozan Creek	Natural	Perennial	.11
Ozan Creek	Manmade (1965)	Perennial	.09
Ozan Creek	Natural	Perennial	.15
Ozan Creek	Manmade (1965)	Perennial	.06
Ozan Creek	Natural	Perennial	.05
Ozan Creek	Manmade (1965)	Perennial	.04
Ozan Creek	Natural	Perennial	.14
Ozan Creek	Manmade (1965)	Perennial	.09
Ozan Creek	Natural	Perennial	.14
Ozan Creek	Manmade (1965)	Perennial	.06
Ozan Creek	Natural	Perennial	.23
Ozan Creek	Manmade (1965)	Perennial	.04
Ozan Creek	Natural	Perennial	1.12
Ozan Creek	Manmade (1965)	Perennial	.09
Ozan Creek	Natural	Perennial	.45
Ozan Creek	Manmade (1965)	Perennial	.07
Ozan Creek	Natural	Perennial	.42
Ozan Creek	Natural	Intermittent	.38
Ozan Creek	Manmade (1965)	Intermittent	.11
Ozan Creek	Natural	Intermittent	.65
Ozan Creek	Manmade (1965)	Intermittent	.33
Ozan Creek	Natural	Intermittent	.23
Ozan Creek	Manmade (1965)	Intermittent	.11
Ozan Creek	Natural	Intermittent	.93
Ozan Creek	Manmade (1965)	Intermittent	.10
Ozan Creek	Natural	Intermittent	.29
Ozan Creek	Manmade (1965)	Intermittent	.18
Ozan Creek	Natural	Intermittent	.48
Ozan Creek	Manmade (1965)	Intermittent	.07
Ozan Creek	Natural	Intermittent	.28
Ozan Creek	Manmade (1965)	Intermittent	.17
Ozan Creek	Natural	Intermittent	.42
Ozan Creek	Manmade (1965)	Intermittent	.02
Ozan Creek	Natural	Intermittent	.14
Ozan Creek	Manmade (1965)	Intermittent	.13
Ozan Creek	Natural	Intermittent	.09
Ozan Creek	Manmade (1965)	Intermittent	.14
Ozan Creek	Natural	Intermittent	.22
Ozan Creek	Manmade (1965)	Intermittent	.13
Ozan Creek	Natural	Intermittent	.49
Middle Fork	Natural	Intermittent	.80
Middle Fork	Manmade	Intermittent	6.00
Middle Fork	Natural	Intermittent	2.50
Middle Fork	Natural	Ephemeral	2.60
Middle Fork Tributaries	Natural	Ephemeral	11.80

<u>Stream</u>	<u>Type of Channel</u>	<u>Type of Flow</u>	<u>Miles</u>
South Fork	Manmade (1925)	Intermittent	9.10
South Fork	Natural	Ephemeral	1.40
South Fork Tributaries	Natural	Ephemeral	11.80
Summary			
	Natural	Perennial	3.50
	Natural	Intermittent	7.90
	Natural	Ephemeral	27.60
	Manmade (1965)	Perennial	.59
	Manmade (1925, 1965)	Intermittent	16.59

This tabulation indicates the locations and lengths of the 20 meander cutoffs (2.1 miles total) on Ozan Creek. The cutoffs shortened the length of Ozan Creek from 14.3 to 9.9 miles. The cutoffs averaged about 10 feet in depth with 15 and 20 foot bottom widths. The velocities in Ozan Creek were increased and the capacity was increased from about 800 to 1,000 cfs. About 31 percent of Ozan Creek is manmade ditches. About 69 percent of the streams have natural channels and 49 percent have ephemeral flow.

The Arkansas Department of Pollution Control and Ecology put Ozan Creek in Use Class B and Fishing Class W in the Water Quality Standards for Surface Waters. These classes indicate Ozan Creek is "suitable for desirable warm water species of fish, wildlife and other aquatic and semi-aquatic life, secondary contact recreation and other uses."

Water samples were collected for analyses on South Fork Ozan Creek and Ozan Creek, August 27, 1974. Flow on both Creeks was very low. The sample point on South Fork Ozan Creek was at a county road crossing in the south corner of Section 23, T10S, R25W. The sample point on Ozan Creek was at a county road crossing near its outlet into the Little Missouri River in Section 25, T9S, R24W. Water quality information on Little Missouri River near Murfreesboro was obtained from analyses made by the U. S. Geological Survey from October 1967 to September 1968. Sample results are listed in the following table.

Tests	:	:	:	:
	South	Ozan Creek	Little Missouri	Arkansas
	Fork Ozan	at	River Near	Water
	Creek	Outlet	Murfreesboro	Quality
				Standards (16)

Iron				
Fe - mg/l	0.05	0.55	0.13	0.30 ^{1/}
Manganese				
Mn - mg/l	0.2	0.3	0.1	0.05 ^{1/}
Calcium				
Ca - mg/l	56	35	4.6	-
Magnesium				
Mg - mg/l	1	1	1	-
Alkalinity				
CaCO ₃ - mg/l	102	96	14	-
Sulfate				
SO ₄ - mg/l	58	6	5	10
Chloride				
Cl - mg/l	11	7	3	10
Nitrate				
N - mg/l	0.5	0.8	0.2	-
Phosphate				
PO ₄ - mg/l	1.55	0.90	0.15	-
Total Hardness				
CaCO ₃ - mg/l	145	94	15	-
Conductivity				
Micromhos/cm	360	194	45	-
pH	7.5	7.2	7.1	6.0 - 9.0
Water Temperature				
°C	26	26	15	34
Color - Apparent				
PT - CO Units	30	40	12	-
Turbidity				
JTU	15	17	14	50
Dissolved Oxygen				
DO - mg/l	6.0	5.0	7.7	5.0
Percent Oxygen				
Saturation	73	61	75	-

1/ From Rules and Regulations Pertaining to Public Water Supplies by the Arkansas Department of Health (17).

The Ozan Creek Watershed yields about 68,300 tons of sediment yearly which would be equivalent to an average annual sediment concentration of 660 milligrams per liter. Water chemical analyses indicate that the innate productivity of the water is good for fishery. Waters with low total alkalinity values are generally biologically less productive than those with high values (15). Water quality analyses from Ozan Creek revealed that CaCO_3 total hardness ranged from 94 milligrams per liter to 145 milligrams per liter and alkalinites from 96 milligrams per liter to 102 milligrams per liter. These are considered average values.

Water temperatures in the streams are mostly dependent on the air and soil temperatures during and following rainfall periods because most of the flow is ephemeral or intermittent.

There are 75 acres in 150 small farm ponds, 24 acres of natural lakes as Little Missouri River remnants, and 113 acres in 10 ponds larger than 5 acres within the watershed.

The watershed has 228 acres of Type 5 wetlands (5), which are inland open fresh water and occur in the old channels of the creeks, and 24 acres of Type 6 wetlands, which are shrub swamps and occur along the lower flat reach of Ozan Creek.

Channels that traverse the Marlbrook Marl Formation tend to be deep with steep sides. The channel bed and lower one to two feet of the channel banks are in marl. Most of the banks are in residual clay. The channel beds in the marl tend to fluff and crack when dry and become highly susceptible to erosion during flows. This has resulted in about two feet of channel degradation and voiding of adjacent land.

2. Present and Projected Population

The 1970 population of Hempstead County was 19,308 (8). Projected population for the year 2000 is 25,000. Of this projected population, 13,000 is rural and 12,000 is urban.

Population of the watershed is presently 2,160. Projected population for the watershed is 3,200 in the year 2000.

Changes in the area's population are functions of changes in the area's unemployment. Social conditions tend to improve as the resources of an area are developed and more employment opportunities become available. There are indications that the population in this area is beginning to stabilize. The future trend is expected to be that of an increasing population.

3. Economic Resources

The Southwest Proving Ground was established in Hempstead County as a part of the national defense effort during World War II. The portion of the defense installation occupying part of the watershed is shown on the Project Map (Appendix B). In 1947, the federally owned land was cleared of unexploded surface ordnance and returned to private ownership; however, a portion of the area was conveyed to private ownership for surface use only. This area is designated on the Project Map as the "hot area."

Currently, land in the watershed is privately owned. The major source of income is from the sale of poultry, livestock, and timber products. Major farm enterprises are poultry, cattle, soybeans, small grains, and livestock supporting crops. Poultry production is a major enterprise in Hempstead County. In 1969, broiler sales amounted to about 40 percent of the value of all agricultural products sold in the county (7).

The 240 farms in the watershed average 265 acres per farm. About 75 of the farms are in the flood plain.

Agricultural yields per acre in the flood plain consist of hay, 3.5 tons; pasture, 8 animal unit months; soybeans, 35 bushels; and small grain, 50 bushels. Yields in the upland areas of the watershed are hay, 2 tons, and pasture, 5 animal unit months.

From 1965 to 1970, the average value of land and buildings in Hempstead County increased from \$21,764 to \$41,881 per farm unit (7). The flood plain land is valued at about \$400 per acre. The value of the upland varies according to the location and its intended use. The upland suitable for agricultural use is valued at about \$300 per acre.

A system of paved highways and county roads provides access to most of the watershed except during floods. The highway system consists of State Highways Numbers 4, 24, 29, and 195.

The City of Hope (1970 population 8,830) (8) is 12 miles south of the watershed and is the major trade center for most of the watershed residents. There are ample loading facilities for agricultural products at Hope. Rail transportation needs are met by the St. Louis and San Francisco, Missouri-Pacific, and the Louisiana and Arkansas Railroads. Four major trucklines serve the City of Hope and freight service is adequate. The industrial activity of Hope centers around lumber and woodworking industries. Sawmills, both pine and hardwood, represent a chief source of employment. Allied plants produce handles, lumber, pulpwood, crossties, and synthetic plywood or building boards. The poultry industry in the county is supported by various types of industries located in Hope.

Several wood-using outlets for sawlogs and pulpwood exist near the watershed. However, farm forests are understocked and have only a small impact on the economy of the watershed. Proper management can correct this situation because forest sites are potentially productive. This is substantiated by production achieved on industrial lands (saw-timber volumes over 3,500 board feet per acre and pulpwood volumes over 450 cubic feet per acre).

The occurrence of fires and grazing pressure is diminishing. This should accelerate the beneficial effect of any forest management practice implemented during the program period.

The urban population of Hempstead County increased from 8,399 in 1960 to 8,830 in 1970. The rural population decreased from 11,262 to 10,498 during this same period (8). Outmigration from the county is attributed to lack of employment opportunities. Underemployment is prevalent throughout this general area because of the seasonal aspects of the labor pattern. Logging contractors generally lay off many woods workers during inclement weather. This results in about 300 workers being unemployed for varying periods of time.

From 1965 to 1970, the number of farms in Hempstead County decreased from 1,395 to 944; however, the average size of farms increased from 190 acres to 225 acres. In 1970, about 282 or 30 percent of the farms in Hempstead County had agricultural sales under \$1,000. Farms with sales under \$2,000 constituted 45 percent of the total (7).

Of the total number of farms in the county, 735 were fully owner-operated, 155 were part-owner-operated, and 54 were tenant-operated in 1970 (7).

Per capita income for Hempstead County in 1972 was \$2,691. This was below the national average of \$3,687 and nearly equal to the average for the State of Arkansas of \$2,791. The unemployment rate for the county was 4.3 percent (1 and 4).

Hempstead County is located in the Southwest Arkansas Planning and Development District. The county is eligible for public works grants and business loans under Title IV of the Economic Development Act of 1965. The primary purpose of this act is to improve economic and social conditions in economically depressed areas.

The Overall Economic Development Plan which has been developed for the county stresses the need for watershed protection programs to improve the social and economic well-being of the inhabitants of the area. The proposals outlined in the work plan will complement other programs for economic development of the area by providing greater employment opportunities for the unemployed and underemployed.

Hempstead County is also included in the Southwest Arkansas Resource Conservation and Development Project. This project encompasses a twelve-county area and was established under the provisions of Title I of the Food and Agriculture Act of 1962. This project provides federal assistance for projects in the multi-county area that will conserve, improve, develop, or more efficiently utilize land, water, and other natural resources.

4. Plant and Animal Resources

Most of the watershed consists of scattered fields interspersed with tracts of woodland. Some of the best deer habitat in Arkansas occurs in this area. Squirrels, turkeys, rabbits, bobwhites, and doves are common upland game species. Only a few waterfowl use this area, with most use confined to existing farm ponds.

Fish resources are limited to numerous farm ponds and the stream fishery in the lower reaches of the creeks. Farm ponds are stocked with bass, bluegills, redears, and channel catfish. Many of these fish escape to streams during periods of excessive rainfall and furnish an important part of the catchable population. Native fish, such as green sunfish, longear sunfish, bluegills, warmouth bass, largemouth bass, channel catfish, and bullheads, form an important part of the stream fishery.

All but 4.1 miles of the creeks cease to flow during the summer. The stream fishery is confined to small pools, mostly in the lower parts of the creeks, while much of the upper parts of the creeks are dry.

Furbearers, such as muskrat, beaver, raccoon, and opossum, are common along the creeks. Mink, otter, and weasels are rare.

Principal watershed streams are Ozan Creek, Middle Fork of Ozan Creek, and South Fork of Ozan Creek. About 4.1 miles of Ozan Creek in Reach IV has permanent flow. The typical permanent pool in Reach IV has a depth of six feet and a width of 30 feet. The stream water registered 70 milligrams per liter total hardness in October 1974.

There are 212 surface acres of standing water fishery in the watershed. Small farm ponds comprise 75 acres, natural lakes cover 24 acres, and ponds larger than 5 acres inundate 113 acres.

The Arkansas Game and Fish Commission conducted a statewide fishery survey in the 1950's. The sport fishery value of Ozan Creek, South Fork of Ozan Creek, and Middle Fork of Ozan Creek was determined. One mile of Ozan Creek, at its mouth, was rated as a poor sport fishery. All other streams in the watershed were rated as "in need of water or fundamental improvement." Streams outside the watershed in Hempstead County consisted of 19 miles of good sport fishery, 22 miles of fair sport fishery, and 14 miles of poor sport fishery. Sport fishery values in 1972 appeared to be the same as at the time of the survey.

Land use is the most important factor that affects wildlife populations. A tabulation of the land use in the flood plain and upland parts of the watershed is as follows:

Use	Flood Plain		Upland	
	Acres	Percent	Acres	Percent
Cropland	6,800	60	2,213	4
Pasture and Hayland	2,007	18	25,193	49
Forest Land	2,319	20	23,634	45
Other	<u>300</u>	<u>2</u>	<u>1,152</u>	<u>2</u>
Total	11,426	100	52,192	100

Within the land uses, there are 8,800 acres of "edge" habitat (interspersion between woodland and other land uses), 228 acres of Type 5 wetlands (inland open fresh water), and 24 acres of Type 6 wetlands (shrub swamps). About 3,300 acres of flood plain are inundated for short durations in the spring. However, the duration is too short to classify the acreage as Type 1 wetland (seasonally flooded flats).

The flood plain land use favors farm game such as bobwhite, cottontail and mourning dove. This applies especially to Reaches II and III where the flood plain is narrow and the interspersion of cropland, woodland, odd areas, and ditchbanks is more frequent. In Reach IV, where woodland is a major land use, whitetail deer habitat is excellent. According to the Arkansas Game and Fish Commission a wild turkey flock, approximately 25 birds, is found near Reach IV.

Land use in the upland supports principally deer and small forest game species. Croplands (4 percent upland land use) support local populations of bobwhite and cottontail. The grassland-woodland interspersion in the Texas Blackland Prairie supports smaller wildlife populations than the grassland-woodland interspersion in the forested Southern Coastal Plain.

No federal or state owned land exist in the watershed to assure free public access to the fish and wildlife resources. Hunters have access to 5,000 acres of woodland owned by International Paper Company. Much of the privately owned land is posted, but watershed residents and others who ask permission are usually permitted access to the fish and wildlife resources.

About 56 species of fish have been collected from the Little Missouri River near the outlet of Ozan Creek. These same species are possibly in the Ozan system. The physical qualities that reduce the probability of all 56 species inhabiting the system for significant periods are only 5 percent permanent flow, maximum pool depths of 6 feet and widths of 30 feet, and limited riffle areas.

Adult longnose gar will move into the Ozan Creek stream system to spawn and the young gar will spend their first summer there, then migrate into the Little Missouri River as adults. Other species following the same pattern are buffalo fish, black bass, crappie, bullheads, and bowfin. In the spring, these adult species are found in the Ozan system. In other seasons, they are found in Reach IV where backwater from the Little Missouri River enters the Ozan Creek Channel.

Resident species of the Ozan Creek system are forage fish and smaller sunfish. Prevalent forage species are grass pickerel, golden shiner, emerald shiner, bigeye shiner, redfin shiner, blacktail shiner, blackspotted topminnow, mosquitofish, tadpole madtom, brindled madtom, creole darter, harlequin darter, and logperch. Longear sunfish, green sunfish, and bluegill are the dominant sunfish and any sample will reveal different size classes.

The Ozan Creek stream system will provide an estimated 75 annual man-days of fishing in Reach IV during the spring and early summer.

Watershed streams support no commercial fishery. The Arkansas Game and Fish Commission reported that in 1970 no residents of the watershed purchased commercial fishing licenses, regular or casual. This indicates that residents do not use the watershed fishery resource commercially.

The 40 acres of catfish-producing ponds in the lower end of the watershed comprise about 50 percent of the intensive fish culture in Hempstead County.

The average number of deer legally killed per county in Arkansas in 1971-72 was 312. Hempstead County reported 419 legal kills of deer, which ranked 19th statewide. This indicates an above average deer population in the area.

Hempstead County reported three turkeys killed in the northern two-thirds of the county in 1972. Small turkey harvests have occurred for the past 10 years.

No data exist for waterfowl populations, but the scarcity of wetland habitat indicates that waterfowl populations are low.

In 1970, the relative density of resident mourning dove populations in the West Gulf Coastal Plain physiographic region, of which this watershed is a part, was below average. Density estimates of fall populations of other small game species, based on present land use, indicate one rabbit (cottontail and swamp) per 8 acres (total area), 1 bobwhite per 15 acres (total area), and 1 squirrel (gray and fox) per 7 acres (woodland only).

Nongame mammals found in the watershed during some portion of their life history are the least shrew, short-tailed shrew, eastern mole, 10 species of bats, nine-banded armadillo, and 15 species of rodents, including 3 old-world species (house mouse, black rat, and Norway rat).

Because of the mobility and migratory nature of birds, as many as 250 species may be seen in one day. Wetland species are less likely to be seen in this watershed than openland or woodland species.

Major groups and number of species of amphibians and reptiles that may be found within the watershed during all or a part of their life cycle are presented in the following list:

- Toads - 2 species
- Frogs - 10 species
- Salamanders - 9 species
- Lizards - 8 species
- Turtles - 11 species
- Snakes - 31 species, including the Texas Coral Snake, Southern Copperhead, Western Cottonmouth, Canebrake Rattlesnake, Western Pygmy Rattlesnake, and Western Diamondback Rattlesnake.

Rare or endangered species that may be permanent residents or casual visitors to the watershed are the red-cockaded woodpecker, bald eagle, and red wolf (14).

5. Recreational Resources

The watershed has limited recreational resources. These consist primarily of scattered open fields, tracts of forested land, and Ozan Creek. The resources provide sightseeing, hiking, birdwatching, and pleasure driving.

Access to the resources is usually permitted by the landowners.

The intermittent and ephemeral streamflows and streambank erosion cause the streams to have low values as recreational resources. No recreational facilities are available in the watershed.

6. Archeological and Historical Values and Unique Scenic Areas

The Arkansas Centennial Commission erected a marker, Henry's Chapel Monument, in the southwest corner, SE 1/4, SE 1/4, Sec. 12, T11S, R26W, in 1936. The marker is at the reputed location of the first Methodist Church erected in Arkansas. The church, Mt. Moriah, was erected in 1816 under the direction of the first Methodist preacher in south Arkansas, The Reverend John Henry. Mt. Moriah Home Church is presently 1/4 mile south of Henry's Chapel Monument. No historical place is listed in, pending inclusion to, nor under consideration for nomination to the National Register of Historic Places in the watershed.

The Arkansas Archeological Survey, under a cooperative agreement with the Soil Conservation Service, prepared a preliminary report on the archeological resources of the watershed. The report covers only the reservoir areas of the proposed floodwater retarding structures.

A gross chronological cultural sequence can be determined for this area (13). Prehistoric cultures including Paleo-Indian (Circa 10,000 to 6,000 B.C.), Archaic (Circa 6,000 to 2,000 B.C.), Fourche Maline (Circa 1,000 B.C. to 500 A.D.), and pre-Caddoan and Caddoan (Circa 500 A.D. to 1,600 A.D.) are well represented in artifact surface collections. Early Historic artifacts represented in surface collections brings this gross chronological cultural sequence up to the present.

Based upon the work of M. R. Harrington (1920), the archives, and the Ozan Creeks Watershed archeological survey, this area of southwest Arkansas is extremely important archeologically, from both a prehistoric and a historic perspective. Not one of the aforementioned prehistoric cultures or the historic culture has been examined adequately in the Ozan Creeks Watershed portion of Arkansas. Before the prehistoric and historic cultural picture of Arkansas can be completed, this portion of southwestern Arkansas must be investigated archeologically.

Paleo-Indian and Archaic cultures of this area are relatively unrecorded. The Fourche Maline culture is known to exist in this area; however, its cultural attributes have not been investigated adequately. The Caddoan culture has been investigated to some degree, but cultural reconstruction for the Ozan Creeks area is not possible based upon the existing data. The early historic period of this area has been preserved to a certain extent by Washington State Park. Nevertheless, the outlying areas, the areas around Ozan Creeks, must have provided water and farm land for subsistence for the early inhabitants of Washington, Arkansas.

Certain specific sites near the Ozan Creeks area have, however, been archeologically investigated. The Mineral Springs site (Bohannon 1973) and selected sites on the Little River prior to the construction of Millwood Reservoir (Hoffman 1967a and 1968) have contributed to a much better scientific understanding of the Caddoan culture in southwest Arkansas. Schambach (1973) has provided a general sequence of diachronic cultural history for the Mid-Ouachita region in south-central Arkansas based predominately on two pre-Caddoan sites, Cooper and Means. All of these sites produced valuable archeological data; therefore, sites in the Ozan Creeks area should also contain significant archeological information badly needed for socio-cultural reconstruction of the indigenous populations of southwest Arkansas.

Many more archeological questions need to be answered before this adequate reconstruction of past life-ways can be obtained. Sites located in the Ozan Creeks drainage can answer several of these questions. Cultural relationships between sites of the same time period can be determined. Relationships between ceremonial centers and outlying hamlets, and between similar ecological niches as well as different ecological niches can be understood in much more depth than presently known.

The following table is an inventory of archeological sites located during the archeological survey.

Archeological Site Number	:	Cultural Association
3HE40		Caddoan
3HE41		Caddoan
3HE115		Fourche Maline
3HE116		Unknown
3HE117		Unknown
3HE118		Archaic and Caddoan
3HE119		Archaic
3HE120		Archaic and Fourche Maline
3HE121		Possibly Archaic
3HE122		Fourche Maline, Caddoan, Historic
3HE123		Possibly Paleo-Indian and Caddoan
3HE124		Possibly Fourche Maline and Caddoan
3HE125		Possibly Caddoan
3HE126		Archaic
3HE127		Possibly Archaic and Caddoan
3HE128		Caddoan
3HE129		Possibly Fourche Maline
3HE130		Possibly Archaic
3HE131		Possibly Caddoan
3HE132		Caddoan
3HE133		Fourche Maline and Caddoan
3HE134		Possibly Caddoan
3HE135		Caddoan
3HE136		Possibly Caddoan
3HE137		Caddoan
3HE138		Caddoan
3HE139		Caddoan
3HE140		Caddoan
3HE141		Caddoan
3HE142		Caddoan
3HE143		Caddoan
3HE144		Unknown

7. Soil, Water, and Plant Management Status

Trends in land use changes in the flood plain have been from intensive cropping to grassland operations because of increased hazard of flooding. This trend is most pronounced in the areas of frequent flooding.

The future trend in the entire watershed is expected to include further conversions among the various land uses. The following conversions are expected in the woodland of the watershed; 4,000 acres to pasture and hayland, 300 acres to cropland; and 800 acres for use as wildlife habitat. Other expected conversions include about 800 acres of rangeland to pasture and hayland, 500 acres of pasture and hayland to cropland, and 300 acres of idle land to cropland.

Completed land treatment measures include conservation cropping systems, 7,000 acres; contour farming, 400 acres; crop residue management, 7,000 acres; brush management, 18,000 acres; deferred grazing, 500 acres; grassed waterways, 2 acres; pasture and hayland planting, 19,449 acres; pasture and hayland management, 14,000 acres; proper grazing use, 1,000 acres; wildlife habitat management, 300 acres; diversions, 50,000 feet; farm ponds, 150; drainage mains and laterals, 50,000 feet; drainage field ditches, 50,000 feet; terrace gradient, 150,000 feet; and grade stabilization structures, 10.

The watershed is served by the Hempstead County Soil and Water Conservation District. Technical assistance is provided to the district by the Soil Conservation Service field office at Hope, Arkansas. About 72 landowners cooperate with the district. Conservation plans covering 70 percent of the watershed have been developed with these cooperators and about 70 percent of the planned measures have been installed. These measures have proven beneficial in retarding rainfall runoff and reducing soil erosion.

Soil surveys within the watershed are in progress. The lack of completed standard soil surveys is not expected to hinder the application of needed land treatment measures. About 47,384 acres will require mapping during the project installation. About 4,000 acres will be mapped with funds from the present program and 43,384 acres with funds from Public Law 566. The needed surveys can be made during project installation.

The only major forest management has been on the 5,000 acres of industrial forests.

Effective fire protection is provided by the Arkansas Forestry Commission in cooperation with the U. S. Forest Service through the Clarke-McIlroy Cooperative Fire Control Program. Other available federal-state forestry programs include Cooperative Forest Management, Cooperative Reforestation, General Forestry Assistance, and Cooperative Insect and Disease Control.

8. Projects of Other Agencies

Ozan Creek Watershed is located in the Little Missouri River Basin and is affected by flood control works constructed in the basin (12).

The Corps of Engineers completed, in 1950, the construction of Narrows Dam-Lake Greeson near Murfreesboro in Pike County, Arkansas. This project regulates flood flows in the Little Missouri River and Ouachita River Basins.

In 1965, the Corps of Engineers completed the construction of channel work projects which are parts of the Little Missouri River Flood Control Plan. This work consisted of channel clearing and snagging and the excavation of 31 cutoffs in the lower 94 miles of Little Missouri River and 20 cutoffs in the lower 14 miles of Ozan Creek. The channel work is maintained by local interests.

An additional flood control reservoir authorized for construction in the Little Missouri River Basin is located on Muddy Fork, a tributary of the Little Missouri River, about four miles west of Murfreesboro. This project has been placed in the "deferred for restudy" category.

Installation of the Ozan Creek Watershed will be compatible with these efforts to control flooding in the Little Missouri River Basin since the project will reduce flood flows from a major tributary in the basin.

F. WATER AND RELATED LAND RESOURCE PROBLEMS

The major problem in the watershed is flood damage to crops on 11,426 acres of the flood plain. Secondary problems are improper land use and management, critical erosion on 250 acres, and channel erosion.

1. Land and Water Management

The conversion of cropland to permanent vegetation in the upland part of the watershed has resulted in the need for different types of land treatment measures. The major problem is the installation of land treatment measures on the small, scattered, actively eroding areas that have resulted from cultivation or overgrazing. Most of these areas are on chalk or marl and should be deferred from use until vegetative covers are established; however, the barren, eroding areas are too small to treat as management units by the landowners and the management units cannot be treated as critically eroding areas for economic reasons. Proper grazing practices are especially important in the upland because of the highly erosive soils and the difficulty of revegetating eroded areas.

Proper land treatment practices such as conservation cropping systems, crop residue management, and onfarm drainage cannot be practiced on the areas of the flood plain that are frequently flooded, nor can these areas be used to their greatest capability. About 18 percent of the flood plain is in pasture and hayland that could be used for cropland if flooding were controlled.

2. Floodwater Damage

About 11,426 acres of bottom land in the watershed are subject to floodwater damages by a 100-year frequency flood.

The flood plain was divided into four reaches to evaluate flood damages. These reaches were located to group areas that have similar flood problems and that are expected to be affected similarly by structural measures. The location, total flood plain, and average annual area flooded in each reach are as follows:

Reach:	Location	: Plain (acres)	: Flooded (acres)
I	East Patrol Road to Common Flood Plain	4,866	14,017
II	South Fork Ozan Creek	1,881	2,075
III	Middle Fork Ozan Creek	3,013	3,247
IV	Common Flood Plain	1,666	6,019
Total		11,426	25,358

The preceding table reveals that the average annual area flooded in all reaches is greater than the total flood plain. This indicates that severe flooding occurs several times annually. The average annual area flooded is the cumulative acres of land flooded by each expected flood in a 100-year period divided by 100.

Flooding in Reach I is severe and restricts land use. Projected land use (without project) on the 4,866 acres of flood plain in Reach I is forest land, 1,460 acres; cropland, 2,189 acres; grassland, 1,119 acres; and miscellaneous, 98 acres. About six damaging floods occur each year and a major flood inundating more than half of the flood plain can be expected annually. Average annual flood damages in Reach I are estimated to be \$275,570. North Fork Ozan Creek contributes to flooding in this reach and in Reach IV.

Flooding in Reach II is less severe than in Reach I. About four damaging floods occur each year and a major flood inundating more than half the flood plain can be expected twice in three years. The use of the flood plain for crop production is hampered by the flood hazard.

Projected land use (without project) on the 1,881 acres of flood plain in Reach II is cropland, 1,222 acres; grassland, 564 acres; and miscellaneous, 95 acres. The average annual flood damages in Reach II are estimated to be \$63,330.

Flooding in Reach III is similar to that in the lower part of Reach II. Reach III has about four damaging floods per year with a major flood occurring once every two years. The land in Reach III is the most highly developed in the watershed, consisting of about 70 percent cropland. Further development is hampered by continued flooding. Projected land use (without project) of the 3,013 acres of flood plain is cropland, 2,129 acres; grassland, 794 acres; and miscellaneous, 90 acres. Average annual flood damages in Reach III are estimated to be \$115,410.

Flooding in Reach IV occurs from two sources, the Little Missouri River and Ozan Creek. Floods from the Little Missouri River have been partially controlled by measures implemented by the Corps of Engineers. Projected land use (without project) on the 1,666 acres of flood plain in Reach IV is forest land, 666 acres; cropland, 500 acres; grassland, 417 acres; and miscellaneous, 83 acres. About six damaging floods occur per year and a major flood that inundates more than half the flood plain is expected annually. Average annual flood damages in Reach IV are estimated to be \$44,990.

Variations in land use and intensity of production are reflected by comparing damageable values and floodwater damages. The following tabulation presents, by reaches, the estimated per-acre value of production, the average annual crop and pasture damage per acre, and the average percent damage to the value of production annually.

Reach :	Location	Damage- able Value Per Acre	Annual Crop and Pasture Damage Per Acre	Gross Production Damaged Annually (dollars)
I	East Patrol Road to Common Flood Plain	95.16	37.53	39
II	South Fork Ozan Creek	122.94	19.13	16
III	Middle Fork Ozan Creek	128.16	20.31	16
IV	Common Flood Plain	86.36	27.00	31

About 45 miles of fence are annually damaged by floods, with an estimated loss of \$25,700.

Damage to roads and bridges in the flood plain of the watershed constitutes nonagricultural damage. About 5.5 miles of county roads are subject to overflow by a 100-year frequency flood. Three roads are damaged annually and two are damaged about once every two years. Average annual road damages are estimated to be \$60,110.

Indirect damages result from threatened or actual flooding and include interruption of travel; loss of income by workers who commute or are unable to work in the fields; loss or delay in sales by local merchants; and additional time, distance, costs, and general inconvenience associated with marketing of farm products, delivering mail, and transporting children to school. Indirect damages of \$45,390 per year are about 10 percent of the direct damages.

A typical major spring flood occurred in May 1969. This flood approached the 2-year frequency event and inundated approximately 8,026 acres of the flood plain. Damages caused by this flood were estimated to be \$266,490. Damages included crop and pasture, \$187,000; nonagricultural, \$35,860; other agricultural, \$19,400; and indirect, \$24,230.

3. Erosion Damage

Total erosion in the watershed results from sheet erosion, 72 percent; streambank erosion, 17 percent; roadside erosion, 5 percent; gully erosion, 3 percent; and flood plain scour, 3 percent. Sheet erosion averages about 2.2 tons per acre per year, ranging from 14 tons per acre per year on a few remaining cropped acres in the upland down to 0.1 ton per acre in the nearly level, infrequently flooded portion of the flood plain.

About 250 acres of watershed land are eroding critically. Active gullies constitute 173 acres of this total, occurring at scattered locations throughout the upland along the southern portion of the watershed. Gullies in this area have eroded into the underlying chalk and marl with erosion rates averaging 29 tons per acre per year. The remaining 77 acres of critically eroding areas consist of streambank erosion immediately downstream from Structures Numbers 17, 19, and 20 (See Appendix B). Erosion from this source occurs in connection with side water entry into the existing channels. Erosion rates range from 6 to 62 tons per acre per year depending on streambank soil materials and the amount of side water entering.

Degradation of the streambed is a problem on about a two mile segment of channel immediately downstream from Structures Numbers 7, 8, and 9 in Reach III and on about 11 miles of channel in Reach II. Most of the channels in these areas have bottoms in marl which is highly susceptible to erosion when dry. Ephemeral flow conditions in the streams lead to periodic drying of the streambed with associated cracking and fluffing.

of the marl. Subsequent stream flows flush the loose material from the channel bed. Degradation of the streambed is occurring at an estimated rate of one-half inch per year, and currently is incised approximately two feet into the underlying marl.

Approximately 2.6 acres per year of flood plain land is being lost by channel enlargement. Essentially all of the streams in Reaches II and III are affected to some degree by channel enlargement. Lateral erosion rates of the channel banks vary between 0.1 and 0.4 feet per year. About 21 miles of channel banks in Reach II and 27 miles in Reach III are affected. This land voiding, which is reducing the flood plain acreage in Reaches II and III by 0.05 percent per year, causes an annual loss of \$2,740.

Flood plain scour occurs on about 285 acres. Of this, 11 acres are damaged 10 percent, 138 acres are damaged 20 percent, and 136 acres are damaged 30 percent. Flood plain scour causes an annual loss of \$7,840.

4. Sediment Damage

Sedimentation by overbank flooding damages crops on 1,116 acres of the flood plain. Most of the damage occurs as a continuous widespread deposit of relatively infertile clay. Deposition has been slow and the sediment texture is similar to that of the original flood plain soils. Of the area damaged, 895 acres are damaged 10 percent, 206 acres are damaged 20 percent, and 15 acres are damaged 30 percent. The damages occur on agricultural land and are equal to an annual loss of \$15,070 of agricultural production.

The average annual sediment yield at the mouth of the watershed is about 68,300 tons. This yield is from Ozan Creek's Watershed only. Although sediment is not a major problem at the watershed outlet, sediment pollution of the Little Missouri River is increased by Ozan Creek. The 68,300 tons of sediment would be equivalent to an average annual sediment concentration of 660 milligrams per liter in Ozan Creek.

5. Recreation Problems

Ozan Creek is a limited recreational resource because the water flows intermittently and the banks are highly susceptible to erosion. During the summer months, the stream fishery is normally confined to small pools in the lower reach of the creek. Sediment deposits and intermittent flows in the stream are detrimental to its recreational potential.

State, county, and private roads provide access to the recreational resources in the watershed, but permission to use the resources should first be obtained from the landowners.

The 1970 population of the urban communities within 50 miles of the watershed was about 40,000. This was a 5-percent increase over the population in 1960. If this trend continues during the life of the project, the urban population would increase to about 65,000.

Millwood Reservoir and Narrows Dam-Lake Greeson, which are Corps of Engineers projects, are within one hour's drive of the watershed.

6. Plant and Animal Problems

Over a period of years land use changes have occurred that have had an overall detrimental effect on wildlife. Upland cotton fields have been converted to pasture or pine plantations. Upland woodland is being converted to pasture and bottom land woodland is being converted to soybeans. Native pasture is becoming improved pasture and, through timber stand improvement practices, hardwood-pine is becoming pine-hardwood. Deer, squirrel, and turkey are all adversely affected by these land use changes, while bobwhite and rabbit would tend to benefit from the changes. Although not enumerated, many nongame species do not benefit from these practices.

Flooding has a minor effect on populations of ground-dwelling and ground-nesting species because flooding is temporary (48 hours or less in Reaches I, II, and III) and coverts exist above the flooded area. Reach IV is subject to flooding from the Little Missouri River as well as from Ozan Creek. Spring floods have the greatest effect. The renesting of birds and immigration of other species repopulate areas affected by flooding.

The watershed can supply its residents with sufficient deer and small game hunting. Waterfowl hunters and turkey hunters have to use other areas to fulfill their hunting pleasures. Virtually all of the fishing demand has to be satisfied outside the watershed. This demand can be met by the standing water habitat within 60 miles of the watershed which include Lake Ouachita, Lake Hamilton, Lake Catherine, Lake Erling, DeGray Reservoir, First Old River Lake, White Oak Lake, Bois d'Arc Lake, Lake June, Narrows Dam-Lake Greeson, and Millwood Reservoir in Arkansas and Lake Texarkana in Texas. DeQueen Reservoir, Dierks Reservoir, and Gillham Reservoir are under construction. These lakes provide 127,000 surface acres of permanent standing water fishery.

Accessible running water fishery habitat is provided by the Ouachita River, Little River, Little Missouri River, Cossatot River, Rolling Fork River, Caddo River, Saline River, Red River, Sulphur River, Bodcaw Creek, Antoine River, Terre Noire Creek, Terre Rouge Creek, and numerous smaller streams.

Public hunting areas within 60 miles of the watershed are the Ouachita National Forest administered by the U. S. Forest Service and 35,000 acres owned and managed by the Arkansas Game and Fish Commission.

Hunters have unrestricted access to areas owned by International Paper Company, Georgia-Pacific Corporation, Potlatch Industries, and Weyerhaeuser Company.

7. Economic and Social

In 1970, about 282 or 30 percent of the farms in Hempstead County had sales under \$1,000. Farms with sales under \$2,000 were 45 percent of the total (7).

The watershed is in an area which is eligible for aid under the Public Works and Economic Development Act of 1965.

Additional employment opportunities are needed in the area. The unemployment rate is 4.3 percent for Hempstead County and the per capita income is \$2,691 (1 and 4). This low income reduces the individual purchasing power and the tax base. General promotion of rural community development is needed in the watershed.

IV. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

There are no known conflicts with the objectives or specific terms of approved or proposed federal, state, or local land use plans, policies, or controls.

V. ENVIRONMENTAL IMPACT

A. CONSERVATION LAND TREATMENT

Practically all of the land in the watershed will receive some treatment during the installation period and all needed treatment will be installed on about 9,000 acres of cropland, 22,000 acres of grassland and 6,100 acres of forest land. These measures will reduce the average annual sheet erosion rate of 2.2 tons per acre by 17 percent and will reduce surface water runoff by increasing rainfall infiltration.

No significant land use changes are expected in the watershed as a result of conservation land treatment measures; however, proper management of grassland and forest land will increase production and will improve the wildlife habitat. The practice of brush management and weed control on grassland will change the diversity of wildlife habitat in some instances by altering wildlife food and cover. Present cover includes areas of brush and weeds which will be suppressed. Grass species will be benefited, including fescue and bahiagrass. These grasses provide winter food for several species of wildlife both from forage and seed production. Specific wildlife species will be favored on the odd areas depending on the habitat that is developed.

The 45 farm ponds to be constructed will encourage proper distribution of grazing and will benefit those species of wildlife that require open water as part of their habitat. Uniform grazing helps prevent areas from being overgrazed and trampled which can result in increased erosion and lead to the development of critically eroding areas.

Sediment yield from the watershed uplands will be reduced about 43 percent by land treatment and structural measures. Stream pollution caused by sediment will be reduced about 44 percent by the project. The average annual sediment concentration will be reduced about 290 milligrams per liter in Ozan Creek at the watershed outlet. Land treatment measures will provide flood damage reduction benefits of about \$4,670 annually.

B. OTHER MEASURES

A total of 21 archeological sites located at 9 floodwater retarding structures will be inundated by the sediment pools of the structures. Three additional sites at three structures will be affected by periodic inundation within the flood pools as the structures function. According to the Arkansas Archeological Survey Report, these recorded archeological sites would be destroyed by salvage or would be inundated.

Henry's Chapel Monument is 1/4 mile from the watershed boundary and will be unaffected by the project.

C. STRUCTURAL MEASURES

The construction of the floodwater retarding structures will require the use of 536 acres of grassland, 301 acres of woodland, and 19 acres of cropland for spillways, embankments, and pools for submerged sediment and the storage of water for low-flow augmentation. When construction of these structures is completed, the 192 acres in embankments and spillways will provide upland grassland type game habitat. Present land use on this 192 acres is 138 acres of grassland, 53 acres of woodland, and one acre of cropland. The affected area currently provides upland wildlife habitat for deer, small game species, and various species of birds.

The 664 acres in the submerged sediment and low-flow augmentation water storage pool areas and 23 acres of farm ponds will be added to the watershed's standing water fishery, an increase of 324 percent. Each reservoir will be stocked with game fish. Of the 664 acres in the pool areas, 398 are presently in grassland, 248 in woodland, and 18 in cultivation. The reservoir areas cover 14 miles of natural streams with ephemeral flow conditions. The drainage area to surface area ratios of the floodwater retarding structures range from 14:1 to 29:1 which are three to six times the ideal ratio of 5:1. Structures Numbers 7, 8, 11, 12, 13, 16, 18, 19, and 20 all have water deeper than 19 feet and will have principal spillways with bottom-water releases. This will insure that infertile, profundal water (below light penetration or low oxygen) will be released rather than the accumulated fertility in the limnetic water (surface water that is too deep for rooted plants). The water to be released from the structures will be aerated as it passes through the principal spillways and stilling

basins of the structures. Water quality downstream from the structures should not be greatly altered. About 348 surface acres of littoral water (supports both rooted and floating plants) will be created within the sediment pools. About 30 miles of "shoreline edge" will be created by the impoundments. All principal spillways will provide for drawdown as a fishery management tool.

There will be 687 surface acres of water added to the watershed's 252 surface acres of Types 5 and 6 wetland. Since some of this acreage is dedicated to storage for downstream release, this acreage is the maximum area to be inundated.

The 1,000 acre-feet of water that will be stored in the planned structures will provide low-flow releases into the downstream channel. An accumulated 15.16 cubic feet per second (6,804 gallons per minute) will be released into channel sections that are now ephemeral. Some of the water will be lost by infiltration, evaporation, and transpiration. Although this may be insufficient water to make the watershed's streams a sport fishery, it will provide more permanent habitat for forage fishes, young-of-the-year sport and food fishes, amphibians, aquatic reptiles, and aquatic invertebrates.

The 250 acres of critically eroded areas will be revegetated with King Ranch bluestem, annual lespedeza, sweet clover, tall fescue, weeping lovegrass, and bermudagrass. Each area will be fenced to restrict grazing and improve the value as wildlife habitat.

About 1 1/2 miles of county roads, 1/2 mile of telephone line, and 1/2 mile of power line will have to be relocated for installation of structural measures.

The proposed project will reduce flooding on 11,426 acres of the flood plain. Average annual area flooded will be reduced 25 percent, from 25,358 acres to 19,124 acres. Reduction in the average annual area flooded, by reaches, is as follows:

Reach Number :	Location	Average Annual Area:		
		Flooded		Reduction (percent)
		Without	With	
		Project	Project	
		(acres)	(acres)	
I	East Patrol Road to Common Flood Plain	14,017	11,783	16
II	South Fork Ozan	2,075	906	56
III	Middle Fork Ozan	3,247	1,336	59
IV	Common Flood Plain	6,019	5,099	15
Total		25,358	19,124	25

Flood reductions in Reaches I and IV will not be sufficient to cause major land use changes or agricultural production increases.

The May 1969 flood, about a 2-year frequency flood, would have been reduced 21 percent (from 8,026 acres to 6,380 acres flooded) if proposed measures had been installed. The following table illustrates flood reduction for the one-half-year, the two-year (May 1969), and the ten-year frequency floods:

Reach Number	One-half Year		Percent Reduction
	Present (acres)	Future (acres)	
I	3,425	3,215	6
II	412	150	64
III	643	209	67
IV	1,500	1,405	6
Total	5,980	4,979	17

Reach Number	Two-year (May 1969)		Percent Reduction
	Present (acres)	Future (acres)	
I	3,832	3,650	5
II	1,078	461	57
III	1,468	654	55
IV	1,648	1,615	2
Total	8,026	6,380	21

Reach Number	Ten-year		Percent Reduction
	Present (acres)	Future (acres)	
I	4,402	4,205	4
II	1,623	1,276	21
III	2,562	2,033	21
IV	1,666	1,666	0
Total	10,253	9,180	10

The project will not provide a large reduction in flooding in Reaches I and IV but damages are high in these reaches (\$320,560 average annual). No measures in addition to those included in the Ozan Creeks Watershed Work Plan are planned to reduce future flood losses in Reaches I and IV. In Reaches II and III, flood reductions will be significant and can be expected to provide a high level of protection.

Flooding disrupts long-range planning and orderly conservation crop rotations in the flood plain. Farmers in the flood plain have indicated that with adequate flood protection they can improve the efficiency of their farming operations on 1,300 acres and increase their income by intensified use of 4,800 acres. Bringing new land into production or increasing agricultural production on new land is not a primary purpose of the project.

Land use and crop yields, as projected by the Economic Research Service, were used as guides in determining future conditions. Projected land use in the flood plain is shown in the following table for "without project" and "with project" conditions for major land uses.

Projected Flood Plain Land Use	:	Without Project (acres)	:	With Project (acres)
Forest Land		2,126		2,126
Cropland		6,040		6,648
Grassland		2,894		2,286
Miscellaneous		366		366
Total		11,426		11,426

The provisions made for low-flow releases from the system of retarding structures will keep the channel beds wet and partially control channel degradation.

Project measures are expected to reduce the annual erosion rate of 39 tons per acre by about 92 percent on 250 acres of critically eroding land.

Land voiding caused by channel enlargement is causing significant land damage. The present rate of 2.6 acres per year will be reduced to 0.6 acre per year and will save about 200 acres during the life of the project.

About 75 farmers will benefit from flood reduction on 11,426 acres.

Damages to roads and bridges in the flood plain will be reduced by the proposed project. The 5.5 miles of county roads damaged by floods more than twice a year will have 25-percent less damages.

Flood damages to the fences and the loss of livestock will be reduced. The project measures will aid livestock operations by reducing crop and pasture damages by 30 percent and other agricultural damages by 33 percent.

The low-flow releases from proposed structures will aid in providing perennial flow downstream from the structures. The flow conditions of channels are presently classified as 27.6 miles of ephemeral, 24.5 miles of intermittent, and 4.1 miles of perennial flow.

The project will serve as an immediate stimulus to the local economy by providing new employment opportunities during the construction period. Employment opportunities will also result from the increased agricultural activity and increased income brought about by project installation. This is particularly significant because of the high rate of unemployment and underemployment in the local area. An estimated 92 new jobs will be added to the local economy and 30 jobs will remain after the construction period.

The local economy will receive additional income from laborers employed during construction. Additional income to farmers will be generated by an increase in the quantity and quality of crops which can be grown in the watershed.

Field investigations indicate that the project will have no effect on mineral resources in the watershed. The sand and gravel, clay, shale, chalk, and marl are found over large areas throughout this portion of the state and deposits are not limited to areas of planned structural measures, which constitute only 2.5 percent of the area of the watershed.

Reservoirs and wet channels offer opportunity for ground water recharge. However, onsite conditions in this watershed indicate that the amount of recharge will be minor. The sediment pools will be small (average about 9 acres) and seepage pressures will be low (average depth about 5 feet).

D. ECONOMIC AND SOCIAL

Increased income will generate additional consumer expenditures for basic necessities, items which improve standards of living, and other goods and services. These expenditures will initiate a chain of spending whereby each successive recipient spends a portion of the amount received. Business activity in other sectors of the local economy will increase as this new income is spent and respent. More employment opportunities will be provided in these sectors.

Protection afforded by the project will give the residents a greater sense of security. Family farms will be strengthened which will help maintain population stability.

The project will contribute to the economic goals of the Southwest Arkansas Planning and Development District and the Southwest Arkansas Resource Conservation and Development Project.

Secondary project benefits result from successive rounds of spending made possible by additional income in the general area. These impacts are based on additional income from the sales of more and better farm products. Farm supply dealers, transporters, processors, and others will have increased

sales. Income will be generated in other sectors of the local economy by business activity as this new income is cycled through the economy.

Increased farm income of \$81,720 annually will result from more intensive use of the flood plain and \$21,710 annually from restoration of land to its former productivity.

Appendix A (Table 6 from the Work Plan) summarizes the benefits and costs of the project. The average annual cost of structural measures is \$247,230. Installation of the structural measures is expected to produce average annual benefits, excluding secondary benefits, of \$261,790. The ratio of benefits to costs will be 1.06 to 1. Total benefits, including secondary, will be \$330,070 and will give a benefit to cost ratio of 1.3 to 1.

E. FAVORABLE ENVIRONMENTAL IMPACTS

1. Flooding will be reduced on 11,426 acres.
2. Average annual area flooded will be reduced 25 percent.
3. Erosion will be reduced 17 percent.
4. Degradation of streambeds will be reduced by maintaining low flows and wet-bottom channels.
5. Sediment yield from the watershed will be reduced 43 percent.
6. Erosion rates on 250 acres of critically eroding areas will be reduced 92 percent.
7. Stream pollution due to sediment will be reduced by about 290 milligrams per liter.
8. Land voiding will be reduced from 2.6 acres per year to 0.6 acre per year.
9. Damages to 5.5 miles of county roads and bridges will be reduced 25 percent.
10. Damages to fences and losses of livestock will be reduced.
11. Lake fish habitat will be created on 664 acres of permanent pools in the reservoirs.
12. Types 5 and 6 wetlands will be increased by 687 acres, 23 acres of farm ponds and 664 acres in the permanent pools.
13. Permanent farm ponds will provide resting and/or feeding areas for migratory waterfowl.
14. Wildlife habitat will be created on 250 acres of critically eroding areas and 192 acres of embankment and emergency spillways.

15. Low-flow releases will aid in augmenting flow in 52 miles of channels that are presently ephemeral (28 miles) and intermittent (24 miles).
16. Underemployment and unemployment will be reduced by the creation of 92 new jobs, with 30 jobs remaining after the construction period.
17. General economy and living conditions of the area will be improved.
18. Increased income will result from the sales of more and better farm products.
19. Average annual net benefits will be \$82,840.

F. ADVERSE ENVIRONMENTAL EFFECTS

1. The floodwater retarding structures will require 536 acres of grassland, 301 acres of woodland, and 19 acres of cropland.
2. The project will convert 14 miles of natural streams with ephemeral flow conditions to reservoir areas.
3. Upland wildlife habitat will be lost on 664 acres in the pool areas.
4. Noise and air pollution at the structure locations will be increased during construction.
5. Some conservation land treatment practices will change the existing wildlife habitat.
6. Archeological sites at 24 locations will be affected by the 10 floodwater retarding structures.

VI. ALTERNATIVES

Alternatives that were deemed remote or speculative were not considered to be reasonable actions that might avoid some or all of the adverse environmental effects of the proposed plan. Reasonable alternatives include those that may be possible under existing authorities. For example, flood plain zoning or restricted land use in this watershed might be possible under county authority, but the probability of implementing such actions on the rural agricultural land would be too low to be a reasonable alternative. However, this alternative as well as flood insurance is viable and reasonable in urban areas. A project to preserve the woodland in the lower part of the watershed as a fish and wildlife development would require a sponsor willing to assume any local obligations which might be incurred. In addition, a state agency would have to accept the responsibility of managing the area. Presently no sponsor is available for this type project.

Alternatives that were considered in formulating the proposed project are as follows: (1) conservation land treatment measures only; (2) conservation land treatment with land stabilization measures; (3) conservation land treatment with land stabilization measures and alternate systems of floodwater retarding structures; (4) conservation land treatment with land stabilization measures, floodwater retarding structures, and a floodway; (5) conservation land treatment and land stabilization measures, floodwater retarding structures, and channel work; (6) no project action.

(1) Conservation land treatment measures only.

The land treatment measures and their impacts would be the same as those previously described in the planned project and impact section. The installation of land treatment measures would reduce erosion rates about 17 percent but would reduce floodwater damages only about 3 percent. Total land treatment measures would cost about \$654,300 and would provide annual flood protection benefits of \$4,670. This alternative would not significantly alter upland wildlife habitat, streamflow patterns, or land use in the flood plain. Some land stabilization measures would be installed on the 250 acres of critical eroding areas by the landowners.

(2) Conservation land treatment with land stabilization measures.

The land treatment and land stabilization measures and their effects were previously discussed. Land stabilization measures, including mechanical measures for erosion control, revegetation, mulch application, fertilization, and fence construction, will result in the same degree of flood reduction as land treatment only; however, a significant source of sediment would be subject to treatment. Erosion on these areas would be reduced by 92 percent from the present annual rate of 39 tons per acre. Treatment of the critically eroding areas with land stabilization measures would also improve the natural beauty of the landscape and would provide 250 acres of wildlife habitat. The cost of this alternative would be about \$803,000.

(3) Conservation land treatment with land stabilization measures and alternate systems of floodwater retarding structures.

Alternate systems of floodwater retarding structures to reduce damages from large volumes of floodwater were considered. Four floodwater retarding structures were considered within the area restricted for surface use where the Southwestern Proving Grounds were formerly located but were eliminated because of the excessive costs and danger involved in construction. Six combinations of structural measures were evaluated in conjunction with land treatment and land stabilization measures on critically eroding areas. If the critically eroding areas were not treated, about 43 percent of the sediment at the structures would come from these

areas and they would continue to erode, enlarge, increase downstream damages and degrade the natural beauty of the landscape. The land stabilization measures would not significantly change the benefits from the floodwater retarding structures.

(4) Conservation land treatment with land stabilization measures, floodwater retarding structures, and a floodway.

A floodway in the lower reach of the flood plain was considered in addition to land treatment and land stabilization measures and floodwater retarding structures. This floodway would contain Ozan Creek during flood stage in the lower reach; however, it would induce flooding upstream. New channels would have to be excavated along the outsides of the floodway to prevent flooding from the tributaries. This alternative would considerably alter the ecosystem in the floodway by increasing flood velocities and stages. Most of the area of bottom land hardwood in the lower reach would be cleared and used for agriculture because of reduced flooding. The cost estimate for this alternative is \$4,648,600.

(5) Conservation land treatment and land stabilization measures, floodwater retarding structures, and channel work.

Channel work in the lower reach instead of the floodway, in combination with the other measures, would stimulate clearing of several hundred acres of hardwood in the lower part of the flood plain. This alternative would result in deterioration of the environmental quality along the natural channel and in the flood plain and would cost an estimated \$4,409,600.

(6) No project action.

If no project action is taken, flood damages will continue to occur, critically eroding areas will continue to enlarge and cause increasing damage, and land treatment measures will continue to be applied at the present rate. Some channel work will likely be done to reduce flooding in the lower reach by individuals or groups without federal assistance. The net annual monetary benefits that will be foregone by not implementing the project will be \$82,840.

VII. SHORT-TERM VS. LONG-TERM USE OF RESOURCES

The 250 acres of critically eroding areas will be fenced and grazing will be restricted until sufficient vegetation is established to reduce the erosion rates to the non-critical level. The worst areas will require 12-15 years to reach this level and even then grazing will be severely limited. More likely, these areas will remain as wildlife habitat and will not be used for domestic livestock grazing. Flood reduction benefits will be realized as soon as the project is installed and farmers can begin to

make land use and management adjustments immediately. The major use of the flood plain is for crop production and it is well suited for this use. The projected long-term use of the flood plain will not change significantly. A wider variety of crops can be grown and irrigation is more likely to be practiced where flooding is controlled. The project will permit the most intensive long-term use of the resources available to agriculture for present and future generations.

The structures provide storage for 100 years of accumulated sediment. With the sediment pools filled, the structures will still trap sediment but to a lesser degree and the effectiveness of the flood prevention capability will decrease.

The Ozan Creeks Watershed is in the Ouachita Water Resource Subregion which has two watersheds authorized for operations, three authorized for planning, and five in the application stage in Arkansas. One of the watersheds authorized for operations is North Fork Ozan which outlets into the upper part of Reach I in the Ozan Creeks Watershed. The ten watersheds represent 17 percent of the Subregion in Arkansas. All the watersheds are for flood control by floodwater retarding structures and include accelerated application of conservation land treatment measures as a basic part of the program. Two of these watersheds include some channel work. Ozan Creeks Watershed is about one percent of the region; so if all of these ten watersheds were installed, the cumulative effects would be similar to those in the Ozan Creeks Watershed and would cover 17 percent of the region.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will require 138 acres of grassland, 53 acres of woodland, and 1 acre of cropland for embankments and emergency spillways. The pools at the crests of the principal spillways will inundate 664 acres. This inundated area slowly decreases as streamflow augmentation water is released from the ungated ports until the 437 acres at the ungated ports are reached. This will occur in extreme drought. The present land use in the proposed pool areas below the principal spillway crests is 398 acres of grassland, 248 acres of woodland, and 18 acres of cropland. These 664 acres are considered as permanent pools that are committed to the project. About 835 acres between the principal spillway crests and the emergency spillway levels will be inundated periodically for a few days following floodwater runoff. The use of this land will not change significantly as a result of the project.

About 14 miles of natural streams with ephemeral flow conditions will be permanently converted to reservoir areas.

Limited grazing of the vegetated embankment and emergency spillway is generally permitted. The use and maintenance is the responsibility of the sponsor of the project.

The 250 acres of critically eroding areas on which land stabilization measures will be installed will be removed from production for a maximum of 15 years.

Materials, labor, equipment, fuel, and capital used in the project would be irretrievably committed resources.

IX. CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

1. General

Consultation and coordination among federal, state, and local agencies have been comprehensive during the development of this plan. Since 1963, meetings with the local sponsors and interested groups were held to arrive at specific project goals and to modify the project plan to accommodate input from various groups.

An application for assistance was made to the Arkansas Soil and Water Conservation Commission on January 31, 1963. This application indicated that the McCaskill Rural Committee of Improvement, the Hope Chamber of Commerce, and the Ozan Creeks Watershed Organization were also interested in the project.

A study of the area was made in August 1963 by the Watershed Planning Party Leader and his staff (two engineers, a geologist, two hydrologists and an economist) and a geologist, an economist, a hydrologist, and an assistant watershed planning specialist from the South Technical Service Center.

A preliminary investigation was made in September 1967. The state set the planning priority for upland watersheds as number five for Ozan Creeks and a request for planning authorization was submitted on May 16, 1969.

The Forest Service began a study of the project in 1963 and finalized their input in January 1972. The Fish and Wildlife Service, in consultation and agreement with the Arkansas Game and Fish Commission, provided input in March 1970 as a summary of their findings. Because of their recommendations and subsequent studies of channel stability in the lower end of the watershed, a meeting of landowners was held on April 22, 1971, to discuss the desirability of omitting all channel work and reducing floods by floodwater retarding structures only and to discuss the locations and sizes of the structures. This alternative was acceptable to the sponsors.

A public information meeting to review the project was held September 25, 1974. Approximately 45 people were in attendance, including landowners and representatives of the Soil Conservation Service, Arkansas /

Division of Soil and Water Resources, Arkansas Game and Fish Commission, and the Arkansas Highway Department.

A cooperative agreement between the Arkansas Archeological Survey and the Soil Conservation Service provided for the state to furnish qualified archeologists, supervision, equipment, and material to perform archeological surveys. The Soil Conservation Service furnished maps, drawings, sketches, and technical specifications of the area to be surveyed and reimbursed the state for performing the archeological survey. The survey: (1) determined if archeological resources exist within the area committed to the project; (2) recorded, identified, and appraised any located resources; (3) evaluated the impact of project installation on each resource; and (4) provided recommendations for mitigation of anticipated adverse impacts. The final report for the Survey was furnished to the Soil Conservation Service in August 1974. Estimates of costs required for salvage or protection were not included in the report.

No historical place in the watershed is listed in or pending inclusion to the National Register of Historical Places.

Consultation with the State Historical Preservation Officer and the Arkansas Archeological Survey indicated that the archeological sites might be eligible for inclusion in the Register. The Soil Conservation Service requested a determination of eligibility on these sites from the Department of the Interior on March 11, 1975, in compliance with Section 800.4(a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800). The Soil Conservation Service has also complied with Section 106 of Public Law 89-665 and Executive Order 11593. The National Park Service on September 5, 1975 notified the Soil Conservation Service that 32 archeological sites in the watershed are eligible for inclusion in the National Register of Historic Places.

Discussion and disposition of each comment on draft environmental impact statement.

Comments on the draft environmental impact statement were requested from the following agencies:

Department of Agriculture, Office of Equal Opportunity
Department of the Army
Department of Health, Education, and Welfare
Department of the Interior
Department of Commerce
Department of Transportation
Environmental Protection Agency
Federal Power Commission
Advisory Council on Historic Preservation
Farmers Home Administration
Arkansas Department of Planning, State Planning and Development
Clearinghouse

Comments were received from all except the Office of Equal Opportunity, Department of Commerce, and the Federal Power Commission.

Comments from the State Planning and Development Clearinghouse included the following:

Arkansas Department of Planning
Division of Soil and Water Resources
Arkansas State Department of Health
Arkansas Department of Parks and Tourism
Department of Pollution Control and Ecology
Arkansas Game and Fish Commission

Copies of the letters of comments are included in Appendix C.

Environmental Protection Agency

Comment: The statement adequately discusses the possible impacts associated with the proposed project. However, we offer the following comment for consideration in developing the Final Environmental Impact Statement:

A brief discussion of the mitigative measures to be taken to minimize the possible adverse impacts of noise and air pollution arising from construction would strengthen the statement.

Response: Concur. Noise from the equipment used during construction cannot be avoided; however, the contractor will keep his equipment in a state of good repair to insure that noise will be held to a minimum. The structures are located in remote areas away from any concentrations of population and the noise problem will be minimal.

Dust is not expected to be a problem but it will be kept within tolerable limits by sprinkling, application of dust suppressors, or by other appropriate means.

The above information has been added to the final Environmental Impact Statement.

Farmers Home Administration

Comment: The Watershed Work Plan and Draft Environmental Impact Statement for the Ozan Creeks Watershed, Hempstead County, Arkansas, received with your letter of December 23, 1974 have been reviewed and we have no comment at this time.

Response: None.

Department of Health, Education, and Welfare

Comment: Our review finds no significant environmental impact where our program standards had responsibilities are concerned. The projects objectives of soil conservation, flood projection and prevention of stream pollution will improve the environmental health conditions in the area, i.e., vector control, water quality and reduction of hazards.

Response: None.

Comment: No dislocations will be required by this project. Other public health concerns associated with such projects include the potential possibility for increased breeding and harborage of insect vectors having health consequences. However, the construction plans and actions will prevent and/or reduce this potential to a minimum. Accordingly, we find no aspects of this project proposal that are objectionable from our environmental health standpoint.

Response: None.

Department of Transportation

Comment: The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

Response: None.

Department of the Army

Comment: We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department. The draft environmental statement is considered to be satisfactory.

Response: None.

Department of the Interior

Comment (1): The proposed action will not adversely affect any existing or proposed unit of the National Park System, nor any site eligible for registration as National Historic, Natural, or Environmental Education Landmark.

Response: None.

Comment (2): An examination of library and file data, without benefit of a field investigation, revealed that during 1974 mineral deposits in Hempstead County yielded sand and gravel, clays, and petroleum, the value of which is withheld to avoid disclosing company confidential information. Within the watershed and its nearby surroundings, known mineral resources include clays, sand and gravel, green sand (glauconitic sand), chalk, marl, and ilmenite. Production to date from the watershed, however, has been limited to sand and gravel. Petroleum is produced some distance south of the watershed near the Lafayette County border. No pipelines are known to traverse the area.

Both documents report on the existence of mineral resources in the watershed (Work Plan page 6, and Environmental Statement, page 15) and recognize that clay, shale, chalk and marl have potential for commercial development. Both documents further recognize glauconitic sands and ilmenite as a noncommercial resource. However, neither document actually describes the effect of the project on these mineral resources.

Response: The following statement has been added to the work plan and environmental impact statement.

Field investigations indicate that the project will have no effect on mineral resources in the watershed. The sand and gravel, clay, shale, chalk, and marl are found over large areas throughout this portion of the state and deposits are not limited to areas of planned structural measures, which constitute only 2.5 percent of the area of the watershed.

Comment (3): We find that the watershed work plan provides insufficient mitigation for wildlife losses attributed to the project. When our report of March 11, 1970 was prepared, we were informed that the project would result in the loss of about 1,000 acres of bottom land hardwood habitat in the flood plain. However, the last sentences on page 46 of the draft statement indicates that about 4,300 acres of woodland will be destroyed by land use changes due to construction of the proposed project. Because the project will result in a loss of woodland habitat which is far larger than that envisioned when the Fish and Wildlife Service prepared its 1970 report, we believe that the project should be reevaluated with a view towards mitigating some of the project-caused wildlife losses. Personnel of our Fish and Wildlife Service will be pleased to cooperate with the Soil Conservation Service in this effort.

Response: The paragraph in question attempted to identify future trends in land use conversions over the entire watershed. It should not have been included in this section of the statement. This information has been moved to the environmental setting under the heading, Soil, Water, and Plant Management Status.

Comment (4): The work plan (page 32, paragraph 4) states that recreational use could occur at the flood-water retarding structures but will not be provided for the following reasons: (1) public use would result in a reduction of the overall

water quality at the structures; and (2) not allowing such public use would minimize the adverse effects of the project. In our view, public use of the proposed reservoirs for hunting, fishing, and other types of recreation should not have a significant adverse effect on water quality or the environment. The Department's Fish and Wildlife Service has responsibility for recommending that public-use facilities be provided at Federal Water development projects of this type. In keeping with this responsibility and stated recommendations of the committee on Government Operations contained in the October 21, 1971, House Report Number 92-586 entitled, "Public Access to Reservoirs to Meet Growing Recreation Demands," we recommend that adequate provisions for public access to all floodwater retarding structures be considered.

Response: This paragraph was revised as follows: Some incidental recreational use could occur at the floodwater retarding structures. Providing public access to the structures is the responsibility of the local sponsors. After due consideration the sponsors decided that they would not provide public access to any of the floodwater retarding structures.

Comment (5): A definition of the proposed "Modified Fencing Program" should be provided, page 36, paragraph 3, last sentence.

Response: References to a fencing program have been deleted from the work plan and environmental impact statement. Fencing is not a part of the proposed project.

Comment (6): The table on page 50 of the projected land use of the flood plain without and with the project indicates that 608 acres of grassland will be converted to cropland with the project and that there will be no other net change in land-use acreages. This data conflicts with land-use change discussions contained in the environmental impact statement on page 31 and should be revised accordingly.

Response:

The present land use tables in the flood plain found on page 15 of the Draft EIS and on page 7 of the Draft Work Plan lists the acreage of pasture and hayland as 2,007 acres, or 18 percent of the flood plain. It is possible that this entire area (2,007 acres) could be converted to cropland, as mentioned on page 31 of the EIS, considering soils, topography, and other factors. Page 50 of the draft work plan indicates the projected conversion of only 608 acres of this 2,007 acres from grassland to cropland.

Comment (7):

A statement is made on page 50, first full paragraph, that, "The conversion of 536 acres of grassland, 301 acres of woodland, and 19 acres of cropland to spillways, embankments, and reservoirs will not affect any critical wildlife value." Although the supply of these habitats is not yet critical, the area does provide habitat for numerous birds and animals; therefore, the wildlife values of these areas should be acknowledged.

Response:

The statement is made on page 52, second paragraph. The following statement has been added to this paragraph.

The affected area currently provides upland wildlife habitat for deer, small game species, and various species of birds.

Comment (8):

We believe that the acreage that has received treatment and the percentage of completion would be more meaningful than the cost of each item. A fish and wildlife management area costing \$300 is itemized on page 60; however, no mention of the benefit of this measures is made in fish and wildlife and recreation discussion on page 51.

Response:

The item mentioned on page 60 of the draft work plan is Wildlife Habitat Management on 300 acres and is shown in Table 1A, Status of Watershed Works of Improvement. Table 1A is used to indicate accomplishments prior to the time of work plan development and are not considered a part of the project. Since they are not a part of the project their effects are not discussed.

Comment (9): The comments on the preliminary draft EIS provided the State Conservationist by the Department's Fish and Wildlife Service, on October 11, 1974, are not adequately discussed. Consequently, many of the errors of the preliminary draft have been carried over to the draft EIS.

Response: Comments by the Fish and Wildlife Service on the preliminary draft EIS were considered during subsequent revisions of the EIS. Following are the comments and responses reflected in the Draft EIS.

"This is in response to your September 24, 1974, letter requesting our comments on the preliminary draft environmental impact statement for the Ozan Creeks Watershed project, Hempstead County, Arkansas. We appreciate your granting additional time for our agency's review, and we sincerely hope our comments will be of assistance to your planning staff.

We are pleased to note that the Fish and Wildlife Service and Arkansas Game and Fish Commission's recommendation to delete certain channel work from the project plans has been adopted by your agency.

In general, we believe the environmental statement should more thoroughly describe project plans, fish and wildlife resources, environmental impacts of the project, and alternatives. The lack of specific information regarding fish and wildlife aspects of the project does not permit an objective evaluation of the project."

Our specific comments are as follows:

PLANNED PROJECT

Comment (a): Pages 3 and 4 -- It is stated on page 3 that mains, laterals, and field drains will be installed by landowners on wet bottom-land soils, and on page 4 it is stated that landowners and operators will be encouraged to manage many odd areas and wetlands as wildlife habitat. It appears questionable if wetland wildlife would be preserved under such a program.

Response: Page 3 discusses the installation of mains, laterals, and field drains on wet bottom-land soils to remove excess surface water. This is included in the discussion of conservation practices to be installed on the 9,000 acres of cropland which will be adequately treated.

Page 4 discusses odd areas and wetlands. Landowners and operators will be encouraged to manage these areas as wildlife habitat.

Land treatment measures are installed voluntarily by the landowners and operators. Technical assistance is available to provide guidance in choosing the best uses to be made of the land.

No change was made in the Draft EIS.

Comment (b): Page 5, paragraph 1 -- The tree species to be planted and their location with respect to existing woodlands should be presented.

Response: Tree planting under the land treatment program is accomplished on a voluntary basis by individual landowners. The species and locations of plantings are determined by a forester trained in watershed management. Technical assistance in the planning and application of forest land treatment measures will be provided by the U. S. Forest Service, by and through the Arkansas Forestry Commission, under the going Cooperative Forest Management Program.

No change was made in the Draft EIS.

Comment (c): The tree species, age classes, and approximate number of trees affected by the practices of improvement cuttings, tree release, and cull removal should be included in the description of the measure.

Response: Stand improvement measures under the land treatment program is accomplished on a voluntary basis by individual landowners. Detailed stand improvement measures will be determined by a forester trained in watershed management. Technical assistance in the planning and application of forest land treatment measures will be provided by the U. S. Forest Service by and through the Arkansas Forestry Commission, under the going Cooperative Forest Management Program.

No change was made in the Draft EIS.

Comment (d): Page 6, paragraph 1 -- The statement indicates trees will be retained in the upper ends of the sediment pools for fish habitat. The final environmental statement should include the approximate acreage of timber to be retained in the sediment and flood pool areas of each reservoir. A description of woodland tree species affected by the proposed structural measures should also be included in this section, along with a description of the wildlife habitat value of the affected woodland.

Response: Paragraph 6 on page 6 was revised as follows:

"Approximately 105 acres of forest land will be retained in the upper one-third of permanent pools and at points where feeder streams enter the pools. This measure will provide shelter and increase fish food production."

Tree species and wildlife species found in the upland areas are discussed in the Environmental Setting.

ENVIRONMENTAL SETTING

Comment (e): Page 20, paragraph 1 -- An investigation should be made to determine if all or portions of the 3,300 acres of flood plain inundated for short durations in the spring and Type 1 1/ wetlands. Wetlands of this type are of high value to migrating waterfowl.

Response: The statement was revised in the Draft EIS to read as follows:

"About 3,300 acres of flood plain are inundated for short durations in the spring. However, the duration is too short to classify the acreage as Type 1 wetland (seasonally flooded flats)."

Comment (f): Page 22, paragraph 2 -- A publication should be cited for the four listed endangered species. These species may be found in the U.S. Department of the Interior's publication "United States List of Endangered Fauna." 2/

1/ U. S. Department of the Interior, Fish and Wildlife Service.
"Wetlands of the United States," Circular 39. Issued 1956.
Reissued 1971.

2/ U. S. Department of the Interior, Fish and Wildlife Service.
"United States List of Endangered Fauna," May 1974.

Response: The above named publication was added as a reference in the Draft EIS.

PROBLEMS

Comment (g): Page 29, paragraph 3 -- The statement that deer benefit from the conversion of upland cropland and woodland to pasture or pine plantations, bottom-land woodland to cropland, native pasture to improved pasture, and hardwood-pine to pine-hardwood is erroneous. From the list of species discussed, only the bobwhite and rabbit stand to gain from such land-use conversions.

Response: The statement was revised in the Draft EIS as follows:

"Deer is the game species that benefits the most, while bobwhite, squirrel, rabbit, and turkey are all adversely affected."

Comment (h): Page 30, paragraph 1 -- The statement, "These hunting, fishing, and recreation resources surrounding the watershed decrease the importance or need for developing such resources," is questionable. We do not believe that the need for developing and preserving wildlife habitat should be minimized. Fish and wildlife habitat within the watershed should be preserved and developed to its maximum productivity to satisfy the consumptive and nonconsumptive demands placed upon this resource.

Response: The statement was deleted from the Draft EIS.

ENVIRONMENTAL IMPACT

Comment (i): Page 30, paragraph 5 -- A complete description of the environmental impact of various proposed land-treatment measures presented in the Planned Project portion of the environmental statement should be presented, including the impact of brush management and weed control.

Response: The following was added to the Draft EIS:

"Present cover includes areas of brush and weeds which will be suppressed. Grass species will be benefited, including fescue and bahiagrass. These grasses provide winter food for several species of wildlife both from forage and seed production."

Comment (j): Page 32, paragraph 2 -- The description of the revegetative and fencing measures associated with criti-

cal area planting should mention the plant species to be established. Insufficient data are presented to permit an evaluation of the wildlife habitat potential.

Response: The paragraph was revised in the Draft EIS as follows:

"The 250 acres of critically eroded areas will be revegetated with King Ranch bluestem, annual lespedeza, sweet clover, tall fescue, weeping lovegrass, and bermudagrass. Each area will be fenced to restrict grazing and improve the value as wildlife habitat."

Comment (k): Page 36 -- There is little or no evidence within the environmental statement to support items 11, 12, 13, 14, or 20.

Response: Items 11, 12, and 13 were revised in the Draft EIS for clarification. Item 14 was not revised. Item 20 was deleted.

ADVERSE ENVIRONMENTAL EFFECTS

Comment (1): Page 37 -- The statements in this section are too general. A discussion should be presented to fully describe the adverse effects that will occur as a result of project plan implementation. A thorough discussion should also be given on the adverse effects that will occur to the endangered species listed on page 22 of the statement.

Response: Page 37 is a summary of the environmental effects previously discussed and only identifies those which are expected to adversely affect the environment. Endangered species listed on page 22 have not been found in the watershed and it is indicated that they "may be permanent residents or casual visitors to the watershed."

No change was made in the Draft EIS.

ALTERNATIVES

Comment (m): Pages 37 - 39 -- Although several viable and reasonable alternatives are considered within this section, additional nonstructural alternatives warrant consideration. These alternatives should include flood plain zoning, acquisition of flood prone areas, flood insurance, flood proofing measures, or other less environmentally destructive courses of action. In conjunction with these alternatives, a resource and

development project measure or an agreement with the project sponsor should be formulated to retain woodland portions of the lower flood plain in their natural state. Some mention is made of the environmental impact for the alternative, "Conservation land treatment measures only," but a thorough discussion is needed to describe the impact of all alternatives.

Response: Additional narrative was added to the Alternative Section of the Draft EIS which discussed the above items.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Comment (n): Page 39, paragraph 2 -- Land-use conversions discussed in this paragraph are in conflict with the projected land uses contained in the table on page 34. The table shows a loss in grassland and no change in forest or miscellaneous land uses.

Response: Land use conversions on page 29 are trends that apply over the entire watershed while the table on page 34 reflects expected changes in the flood plain. Page 39 conversions reflect expected trends while page 34 indicates the direct effects of the project, as indicated in the narrative immediately preceding the table. The Draft EIS included a change in the heading on the table to read "Projected Flood Plain Land Use."

Comment (o): Page 39, paragraph 3 -- The source of irrigation water within the project area should be identified.

Response: The statement was made that "irrigation is more likely to be practiced where flooding is controlled" in the Short-Term vs. Long-Term Use of Resources section of the EIS. No area was projected to be irrigated in the Ozan Creeks Watershed Project nor were any irrigation facilities planned but it was recognized that irrigation could occur in the area.

The statement was not revised in the Draft EIS.

Comment (10): Although land-use requirements for structures, the miles of streams inundated, and the adverse effects of sedimentation during the construction period are adequately summarized, the Summary of Environmental Impact and Adverse Environmental Effects does not leave the reader with an accurate understanding of project-induced land-use changes and their effects

of wildlife resources. The major land-use changes mentioned elsewhere in the statement should be addressed in the summary on page i. The last sentence on page 46 indicates that about 4,300 acres of woodlands will be converted to agricultural production. The summary should include this loss of bottom land hardwood wildlife habitat.

Response: See response to Comment Number 3.

Comment (11): Page 4, paragraph 4 (EIS), contains a very impressive discussion on development of productive wildlife habitat and the installation of protective fencing to help reduce adverse impacts. This statement should include a discussion of how plans to manage forest habitat will be implemented and what commitments will be required from local sponsors.

Response: The paragraph has been revised with the reference to the fencing program deleted. The following has been added to the paragraph:

Landowners having forest land will be encouraged to apply and maintain forestry measures on their forested land. The U. S. Forest Service, by and through the Arkansas Forestry Commission, will provide technical assistance in the planning and application of forest land treatment measures on the watershed under the going Cooperative Forest Management Program. They will provide additional technical assistance for accelerating the installation of forestry measures. A forester trained in watershed management will be assigned to this project to guide and assist the landowners in the installation of planned forestry measures.

Comment (12): An archeological survey by a competent professional archeologist should be conducted over all areas to be affected by the project (procedures of 36 CFR 800). Therefore, we strongly recommend that an archeological survey be completed for structure 22 or the structure not be built (page 8, last paragraph). If the land-owner desires this reservoir, then he must allow archeologists to survey the project area.

Response: As stated on page 10, first paragraph of the Draft EIS, and on page 44, first paragraph of the Draft Work Plan, the Arkansas Archeological Survey will be requested to make an additional investigation after clearing operations have been completed.

Comment (13): The final statement should contain evidence of a review (pages 27-29) of the project by the State Historic Preservation Officer and include comments from the source relevant to the effect of the proposed actions upon historical and archeological resources. We note the draft statement has been sent to the State Clearing-house and this should include distribution to the Historic Preservation Officer. If it does not, his address is:

Arkansas Historic Preservation Program
Old State House
300 West Markham
Little Rock, Arkansas 72201

Response: The State Historic Preservation Officer has reviewed the Draft EIS and has recommended that the archeological sites be nominated to the National Register of Historic Places.

Comment (14): In response to page 10, paragraph 1, the Department's National Park Service has requested funding for salvage excavation. However, if these funds are not appropriated, the Soil Conservation Service would be responsible for contracting the required action, using project or other funds.

Response: On March 11, 1975, the Soil Conservation Service requested that the National Park Service provide a cost estimate for the recovery and preservation of archeological data. The Soil Conservation Service will comply with the provisions of Section 105, Public Law 89-665, Executive Order 11593 and 36 CFR 800, Procedures for the Protection of Historic and Cultural Properties.

Comment (15): The report, page 24, paragraph following Tabular Data states that, "About 3,300 acres of flood plain are inundated for short durations in the spring," but that, "...duration is too short to classify the acreage as Type 1 wetlands (seasonally flooded flats)." However, on pages 32 and 33, frequently damaging floods are listed for the various reaches. Furthermore, these areas receive sufficient water in both the spring and fall and winter to support waterfowl use during the spring and fall waterfowl migrations. Therefore, these areas should be classified as Type I wetlands.

Response: Our investigations indicate that the duration of inundation is too short for this area to be classified as Type I wetlands.

Comment (16): As stated in our letter of October 11, 1974, on the preliminary draft environmental statement, deer will not "benefit" from the land changes listed, i.e., upland woodland to pasture, bottom land woodland to soybeans, native to improved pasture, hardwood pine to pine hardwood (page 36, paragraph 3).

Response: This sentence has been revised as follows: Deer, squirrel, and turkey are all adversely affected by these land use changes, while bobwhite and rabbit would tend to benefit from the changes.

Comment (17): Flood duration data provided for Reaches II and III (page 36, paragraph 4) should also be provided for the more flood-prone Reaches I and IV.

Response: The paragraph has been revised as follows: Flooding has a minor effect on populations of ground-dwelling and ground-nesting species because flooding is temporary (48 hours or less in Reaches I, II, and III) and coverts exist above the flooded area. Reach IV is subject to flooding from the Little Missouri River as well as from Ozan Creek. Spring floods have the greatest effect. The renesting of birds and immigration of other species repopulate areas affected by flooding.

Comment (18): The statement is made on page 37, first paragraph, under Environmental Impact, that all needed land treatment measures will be installed on 6,100 acres of forest land. The tree species to be planted should be identified.

Response: Tree species to be planted will be based upon the recommendations of a forester trained in watershed management, according to site capabilities.

Comment (19): We find that significant effects on water resources have been considered and are briefly discussed. In addition, erosion and flooding have received attention commensurate with the

seriousness of the problems. In general, the project will probably not have any adverse long-range regional effects on the occurrence and availability of water but may show noticeable effect on water quality due to the increased use of fertilizers and pesticides and increased human activity.

Two items that should be given more treatment are the effects on water quality and ground-water recharge. Reservoirs and wet channels offer additional opportunity for recharge. We disagree that bottom release from reservoirs will not affect water quality downstream, as stated on page 39. U. S. Geological Survey Water-Supply Paper 1998 provides additional information on water resources of the area.

Response: The release of water from the structures will have an effect on water quality downstream but this effect is not expected to be great.

The following statement has been added to the work plan and EIS: Reservoirs and wet channels offer opportunity for ground water recharge. However, onsite conditions in this watershed indicate the amount of recharge will be minor. The sediment pools will be small (average about 9 acres) and seepage pressures will be low (average depth about 5 feet).

Comment (20): The first paragraph on page 41 states that, "... agricultural production on new land is not a primary purpose of the project;" however, the last sentence on page 46 states that about 4,300 acres of woodlands will be converted to agricultural production. This amounts to clearing almost 38 percent of the flood plain which, in our view, is a significant increase in agricultural land as a result of the project. We feel that the adverse effects such extensive clearing would have on the big game and upland game resources should be addressed in the land-use discussion.

Response: See response to Comment Number 3.

Comment (21): In the discussion of alternatives (page 44, last paragraph) flood plain zoning or restricted land use is somewhat summarily dismissed for rural agricultural lands but recognized as viable

and reasonable (along with flood insurance) in urban areas. The statement is also made that the probability of implementation of one of these alternatives is remote and that, "A project to preserve the woodlands in the lower part of the watershed as a fish and wildlife development would require a sponsor willing to assume any local obligations which might be incurred. Presently no sponsor is available for this type project."

Our comments on this matter are that all Federal agencies should make every effort to insure that fish and wildlife mitigation measures are an integral part of any publicly financed project which will cause the loss of fish and wildlife resources.

We recommend that further efforts be expended towards developing a program to preserve these woodlands.

Response: The sponsoring local organization, the Hempstead County Soil and Water Conservation District, was advised of the comments by the Fish and Wildlife Service and the Arkansas Game and Fish Commission regarding the preservation of the bottom land woodland in the watershed. The sponsors were unable to assume the added financial costs necessary to lease or purchase these lands. They were unable to secure an agency to participate with them in acquiring the bottom land woodland or in developing some of the reservoirs for public fishing.

Comment (22): It is stated on page 48, third paragraph, that "The 250 acres of critically eroding areas on which land stabilization measures will be installed will be removed from production or beneficial uses for a maximum of 15 years." Elsewhere, the treatment of 250 acres of critically eroding land is accorded merit for the development of desirable wildlife habitat. The phrase, "beneficial use" should therefore be deleted from the first statement.

Response: The phrase "or beneficial use" has been deleted.

Advisory Council on Historic Preservation

Comment: This is in response to your request for comments on the draft environmental statement (DES) and draft watershed work plan (WMP) for Ozan Creeks Watershed, Hempstead County, Arkansas. The Advisory Council has reviewed these documents and has determined that Soil Conservation Service (SCS) has satisfactorily demonstrated compliance with Section 106 of the National Historic Preservation Act of 1966, with respect to this undertaking.

However, the Council also notes on page 20 of the WMP and on page 28 of the DES that "sites in the Ozan Creeks area should ... contain significant archeological information badly needed for socio-cultural reconstruction of the indigenous populations of southwest Arkansas." Based on this information, it would appear that many of the archeological sites, located during the survey and identified in the DES and WMP as being impacted by this project, meet the criteria for inclusion in the National Register of Historic Places.

Therefore, in accordance with Section 800.4(a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), (copy enclosed), which set forth steps for compliance with Executive Order 11593, "Protection and Enhancement of the Cultural Environment" on May 13, 1971, the Council requests that the SCS request, in writing, an opinion from the Secretary of the Interior with respect to these properties' eligibility for inclusion of the National Register and inform us of the findings.

The SCS is reminded that should this evaluation result in determination by the Secretary of the Interior that these properties are eligible for inclusion in the National Register, it is required to afford the Council an opportunity to comment on this undertaking pursuant to Section 800.4(e) of the procedures.

Response: In a letter dated March 11, 1975 the Soil Conservation Service requested that an opinion be made by the National Park Service as to the eligibility of the archeological sites for nomination to the National Register of Historic Places. The National Park Service,

in a letter dated September 5, 1975, stated that the archeological sites were eligible for inclusion in the National Register of Historic Places.

The work plan and environmental impact statement have been modified and indicate that the Soil Conservation Service will comply with the provisions of Section 800.4 (a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R., Part 800) which sets forth steps for compliance with Executive Order 11593 "Protection and Enhancement of the Cultural Environment" of May 13, 1971. The Advisory Council on Historic Preservation will be given an opportunity to comment in compliance with Section 800.4(e) of the procedures.

Department of Planning

Comment: Investigation indicates the Draft Environmental Impact Statement adequately addresses all environmental factors. The Arkansas Department of Planning has no comments regarding this project.

Response: None.

Division of Soil and Water Resources

Comment: We have reviewed the report referenced above. The Draft EIS seems to satisfy NEPA guidelines and the Draft Work Plan appears to be well written.

The flood protection and land treatment measures would benefit the area both economically and environmentally.

Response: None.

Arkansas State Department of Health

Comment: We have reviewed these documents and there are no apparent items which would be detrimental to the public health. Therefore, no comments will be submitted.

Response: None.

Arkansas Department of Parks and Tourism

Comment: Enclosed is a copy of a staff memorandum concerning Ozan Creek. We have reviewed the plan, and while we have no objections, we offer the enclosed comments for the Soil Conservation Service's consideration. Thank you for the opportunity to comment.

The way they plan to implement the land treatment measures are adequate.

Response: None.

Comment: I feel there are too many structures planned. Almost every tributary has a dam on it.

Response: The minimum number of structures were planned to obtain the sponsors' objective for flood reduction.

Comment: The impoundments will be owned by the landowners and public access to the ponds will be left up to the landowners. If access is provided, sanitary facilities are required.

Response: This was discussed on page 8 of the EIS and on pages 32 and 42 of the work plan.

Comment: They include increased fish population as a benefit but only a very small percentage of the populus in the area will be able to realize the benefit.

Response: Increased fish population is an incidental benefit of the project and not a project purpose.

Comment: They do admit that recreation will be very limited. Read page 42 in the work plan.

Response: None.

Comment: A total of 24 archeological sites were located in the reservoir areas during the archeological survey and will be affected by installation of the project. The Secretary of the Interior will be notified of these sites and is responsible for salvage of the sites. The plan points out the importance of these sites but does not say how or when they are to be salvaged. The

Arkansas Archeological Survey will be requested to make an additional investigation after clearing operations have been completed. Definite plans for salvaging of the sites should be included in the plan.

Response: The Secretary of the Interior is responsible for the salvage of archeological sites found in the initial survey and any additional sites found during construction.

Comment: The plan appears to be beneficial for the land-owners and the resource in general; however, the general public will realize very little benefit as far as recreation is concerned.

Response: This project was formulated for watershed protection and flood prevention. Any recreation benefits derived from the project are incidental, and no recreation benefits were claimed for project justification.

Department of Pollution Control and Ecology

Comment: Beginning on page 2 of the Environmental Impact Statement, and also at various places in the Work Plan, there are references to environmental enhancement land treatment measures. These measures, if actually put into practice, would be very beneficial. We realize that the land-owners "will be encouraged" to expend the money and effort necessary to carry out these environmental enhancement measures. We wish, though, that there was some way of obtaining the same assurance and permanency for those practices which would benefit wildlife and other elements of the natural environment as exists for the 22 flood-water retarding structures which are also proposed for the Ozan Creeks Project.

Our Department is not objecting to the Ozan Creeks project. We wish only to emphasize a need for closer cooperation between those who are primarily interested in flood control and those who are primarily interested in the preservation of environmental qualities. Maybe through a genuinely cooperative effort the 566 program could be improved for the benefit of everybody.

Response: Noted.

Arkansas Game and Fish Commission

Comment: Our first observation was that the alternative of flood plain management is not included in the statement as a method of flood control. Since bottom land hardwood habitat is valuable, both for timber production and as wildlife habitat, as pointed out in my letter of February 26, 1970, we feel that this alternative should be considered.

Response: The alternative of flood plain management is included on page 44 of the EIS.

Comment: On page 2, Section 3, Under Fish and Wildlife, we note that "revegetation of critically eroding and disturbed areas" is an improvement to be undertaken. We recommend reestablishment of broadleaf tree species and other plants which will provide cover and food browse for various wildlife species, rather than pine trees.

Response: Plants which are to be planted on these areas are those which are best adapted to site conditions. This determination will be made at the time of planting and revegetation. The land treatment program is discussed on pages 3-5 of the EIS and pages 34-37 of the work plan. Also see Comment Numbers 11 and 18 of Department of the Interior.

Comment: This project, as originally conceived to control flooding, provided for channelization features; however, due to recommendation of the U. S. Fish and Wildlife Service and the Arkansas Game and Fish Commission, the channelization project was deleted because of concern for the remaining overflow bottom land forest and associated wildlife. Thus, the upstream floodwater retarding structures were planned. This is a fine example of cooperation between agencies which represent quite different interests.

Response: None.

Comment: After continuing studies and review we have a few more recommendations on this project.

1. The remaining hardwood habitat in the flood plains of the Ozan Creeks should be retained with its natural vegetative cover through easement arrangement (allowing timber management) and/or acquisition.
2. Provide for public fishing on several of the reservoir sites.

Response:

1. The sponsoring local organization, the Hempstead County Soil and Water Conservation District, was advised of the comments by the Fish and Wildlife Service and the Arkansas Game and Fish Commission regarding the preservation of the bottom land woodland in the watershed. The sponsors were unable to assume the added financial costs necessary to lease or purchase these lands. They were unable to secure an agency to participate with them in acquiring the bottomland woodland for preservation.
2. Providing public access to the floodwater retarding structures is the responsibility of the local sponsors. After due consideration the sponsors decided that they would not provide public access to any of the floodwater retarding structures.

Comment: We are mainly concerned about disappearing habitat and associated wildlife resources. The seriousness of the problem is documented by a letter dated September 6, 1974, to this agency from the State Forester, Mr. B. S. Gresham, in which he states:

"The survey figures bear out the fact that in Arkansas we are cutting more hardwood sawtimber volume than we are growing. This is due to much of the better hardwood sites being cleared and the reduction in tree size for hardwood growing stock. This trend will eventually lead to loss of more of the hardwood lumber and veneer operations in many sections of the state."

The survey to which he refers is the U. S. Forest Service Surveys on Forest Resources and Statistics for Arkansas, 1959 through 1969. He also states:

"I feel land clearing for agriculture and pasture purposes, percentage-wise in the past five years, would be greater than the 1959 to 1969 figure indicates."

We do not think our comments on retaining hardwood habitat are inconsistent with the project goals. Throughout the impact statement, there are statements which would indicate concern for forest management. On pages 3, 4, and 5 the discussion under Land Treatment Measures, especially the paragraph on page 4 which states:

"The Hempstead County Soil and Water Conservation District, the Arkansas Forestry Commission and the International Paper Company will jointly develop a forest land treatment program that will effectively establish and maintain optimal forest productivity and diversity," expresses this concern. The words: "optimal forest productivity and diversity", especially the word diversity would indicate the need for hardwood management as well as pine management. In this we concur since hardwoods also provide excellent wildlife habitat.

Response: Noted.

Comment: On pages 16, 17, and 18, under Economics Resources, mention is made of the fact that: "The industrial activity of Hope centers around lumber and the wood working industries. Sawmills, both pine and hardwood, represent a chief source of employment." Continuing losses of hardwood may well affect the sawmill industry in Hempstead County.

In view of the foregoing comments as stated in the Draft Environmental Statement for the Ozan Creeks project, it is our opinion that measures to retain the remaining hardwood in the flood plain would be completely consistent with the over project.

Response: Noted.

XI. LIST OF APPENDIXES

Appendix A - Comparison of Benefits and Cost for Structural Measures
(Table 6 from the Work Plan)

Appendix B - Project Map

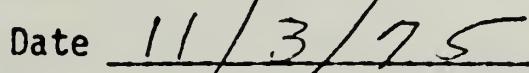
Appendix C - Letters of Comments received on the Draft Environmental Statement

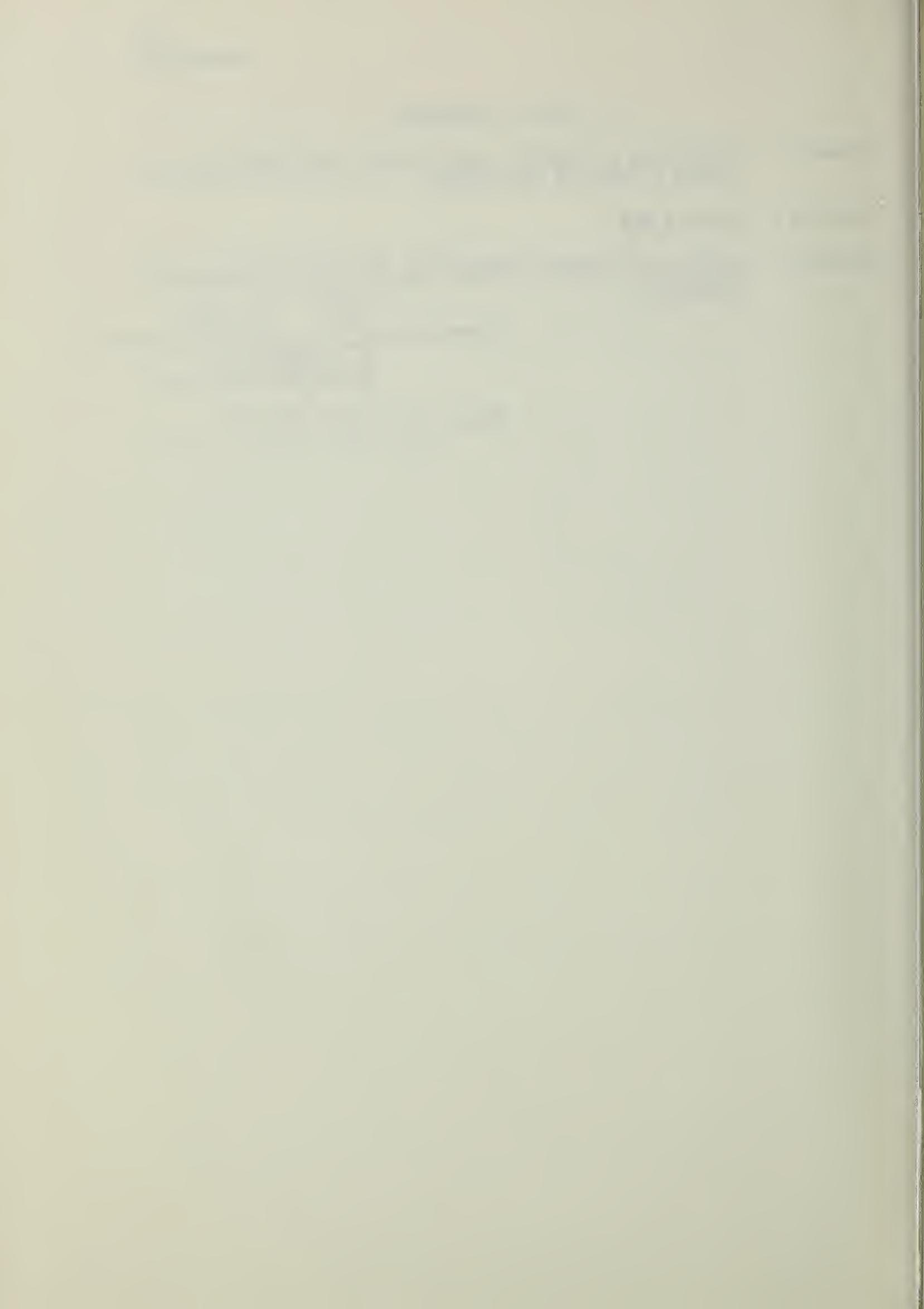
Approved by



M. J. Spears
State Conservationist

Date





XI. LITERATURE CITED

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16. Arkansas Department of Pollution Control and Ecology, Arkansas Water Quality Standards, Little Rock, Arkansas, 1973.
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APPENDIX A - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Ozan Creek Watershed, Arkansas

(Dollars)

		AVERAGE ANNUAL BENEFITS 1/			
	Flood Prevention				
	: More				
	: Intensive:				
Evaluation Unit	2/ : Land Use : Redevelopment: Secondary:			Total	
Floodwater Retarding Structures Numbers 1 through 22 and Land Stabilization Measures	150,950	81,720	29,120	68,280	330,070
Project Administration	-	-	-	-	29,560
GRAND TOTAL	150,950	81,720	29,120	68,280	330,070
					247,230
					1.3:1

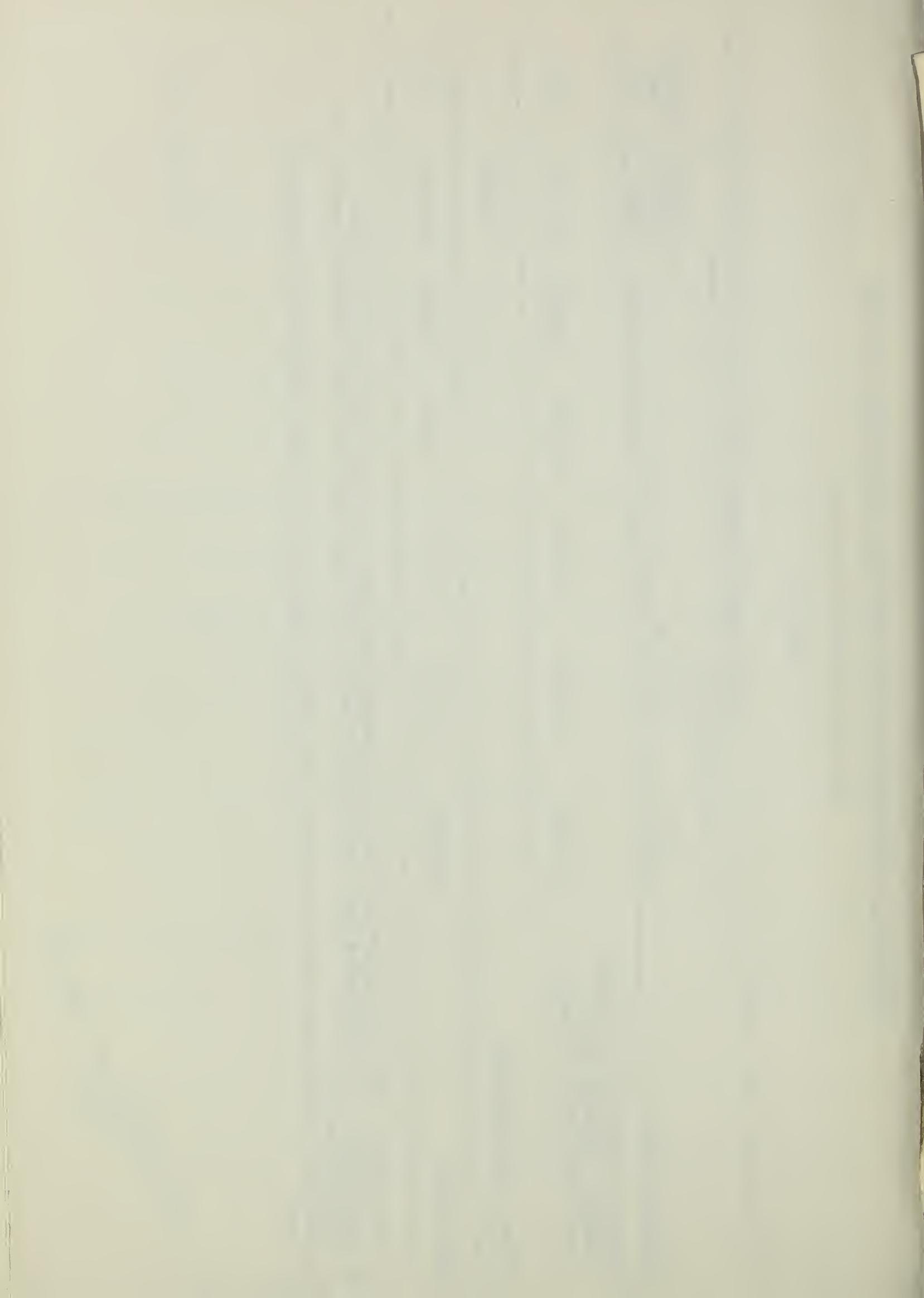
1/ Price Base: Crop and pasture benefits current normalized prices; all other benefits 1973 prices.

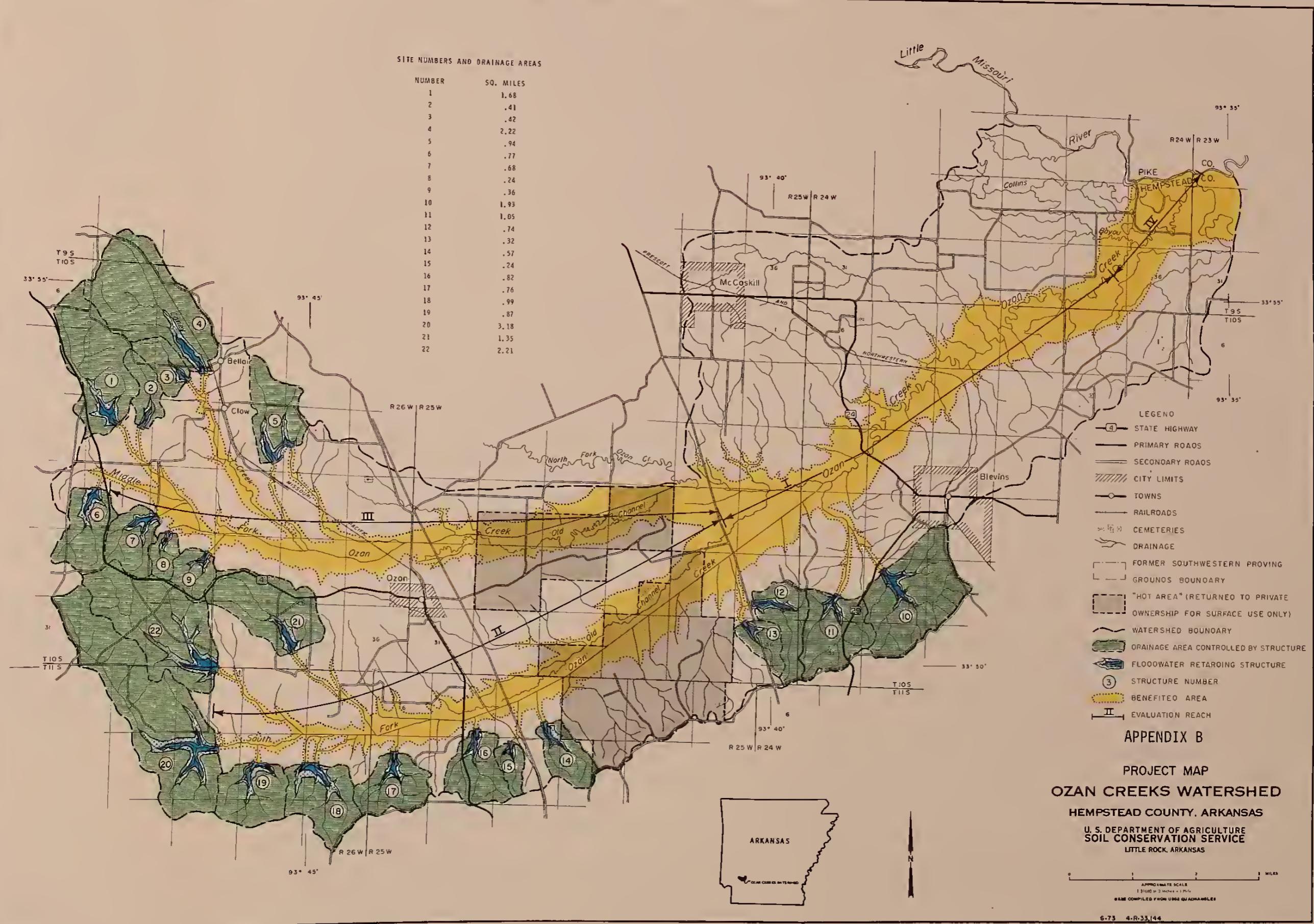
2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$4,670 annually.

3/ Amortized Installation Cost (100 years at 6 7/8 percent interest) plus annual operation and maintenance cost.

February 1974

Det. to Go wk 2







UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1600 PATTERSON
DALLAS, TEXAS 75201

January 17, 1975

R-CU 2	ROUTE
SPEARS /	
LEMON	
SULLIVAN	
EVANS	
ELLINGTON	
DENNIS /	
EDWARDS	
C. RUSSEL	
PRESLEY	
PETERS	
McG. EW	
FILE	

*Action by:

Mr. M. J. Spears
State Conservationist
Soil Conservation Service
P. O. Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

We have reviewed the Draft Environmental Impact Statement and Draft Work Plan for the Ozan Creeks Watershed project. The proposed project will provide watershed protection and flood prevention by the application of conservation land treatment measures, land stabilization measures, and the installation of 22 floodwater retarding structures.

The statement adequately discusses the possible impacts associated with the proposed project. However, we offer the following comment for consideration in developing the Final Environmental Impact Statement:

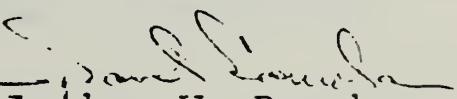
A brief discussion of the mitigative measures to be taken to minimize the possible adverse impacts of noise and air pollution arising from construction would strengthen the statement.

These comments classify your Draft Environmental Impact Statement as LO-1. Generally, we have no objections to the proposed project. The statement contained sufficient information to evaluate the possible impacts which the project may have on the environment. The classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,


Arthur W. Busch
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

IO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

UNITED STATES DEPARTMENT OF AGRICULTURE
FARMERS HOME ADMINISTRATION
Little Rock, AR 72203

December 27, 1974

REC'D	ROUTE
SPEARS	1-13
LEMON	
SWENSON	
EVANS	
SULLIVAN	
EDWARDS	
DENNIS	
PETERS	
McGRAW	
ELLINGTON	
FILE	1-13

*Action by:

1-13

Mr. M. J. Spears
State Conservationist
Soil Conservation Service
P. O. Box 2323
Little Rock, AR 72203

Dear Mr. Spears:

The Watershed Work Plan and draft environmental impact statement for the Ozan Creeks Watershed, Hempstead County, Arkansas, received 1-13 with your letter of December 23, 1974 have been reviewed and we have no comment at this time.

Loan funds are now available and we would appreciate your estimate as to when funds will be required for our use in coordinating the processing of a loan docket.

Sincerely,

Robert L. Hankins
ROBERT L. HANKINS
State Director

cc: County Supervisor 03-29

District Director 7

APPENDIX C

Farmers Home Administration is an Equal Opportunity Lender.
Complaints of racial or ethnic discrimination should be sent to:
Secretary of Agriculture, Washington, D. C. 20250



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGIONAL OFFICE

1114 COMMERCE STREET
CALLAS, TEXAS 75202OFFICE OF
THE REGIONAL DIRECTOR

Our Reference: EI#1274-466

February 3, 1975

Re: Ozans Creeks Watershed,
Hempstead County Arkansas

Mr. M.J. Spears
State Conservationist
United States Department
of Agriculture
Soil Conservation Service
Post Office Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

This office has received the Environmental Impact Statement for the above project proposal forwarded for our review in accordance with Section 102(2)(C) of Public Law 91-190.

REC'D	ROUTED
SPEARS	
LEMON	
SULLIVAN	
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C. RUSSEL	
SEESLEY	
PETERS	
MCLEW	
FILE	<i>Lindner</i>

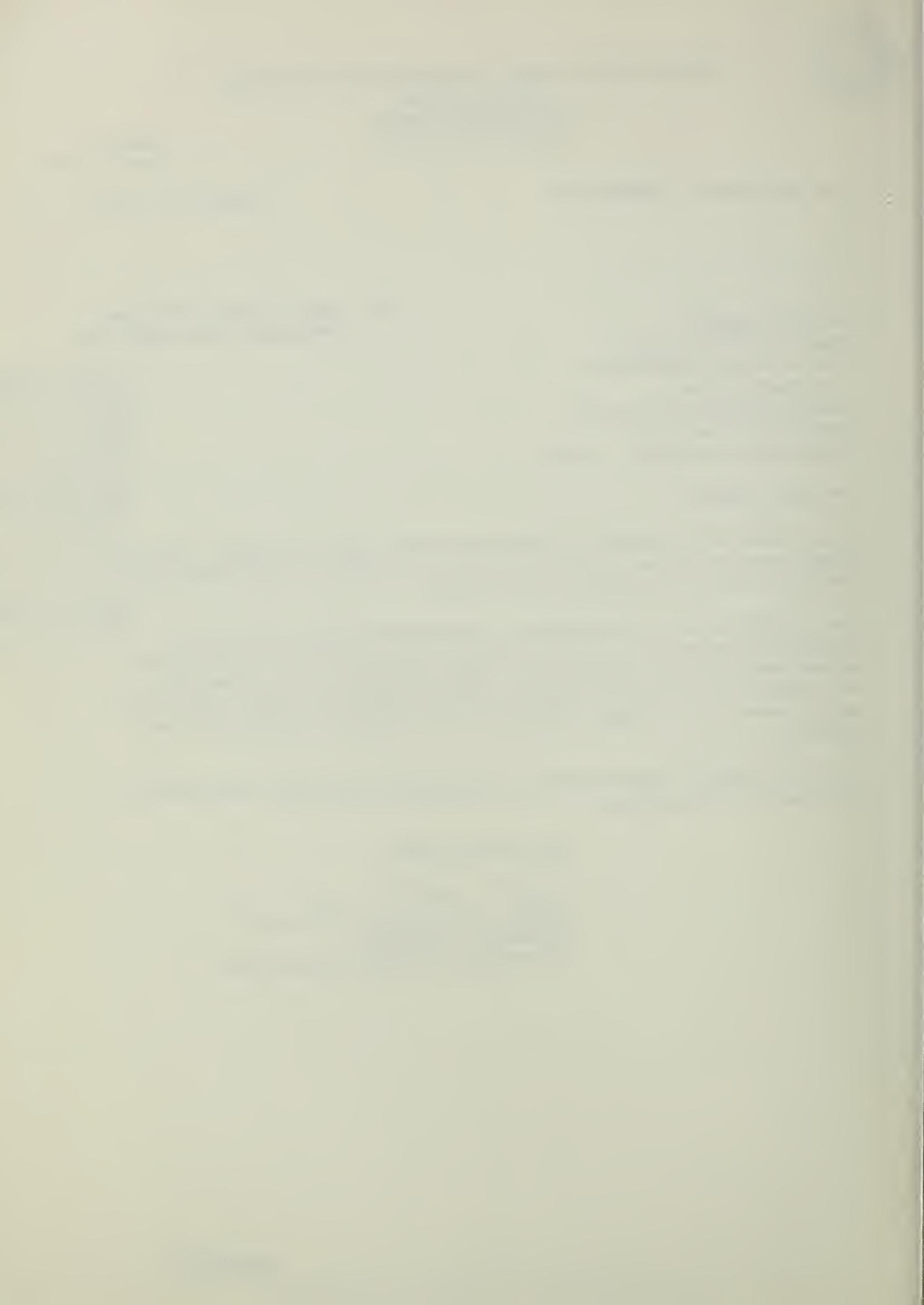
*Action by:

Our review finds no significant environmental impact where our program standards had responsibilities are concerned. The projects objectives of soil conservation, flood projection and prevention of stream pollution will improve the environmental health conditions in the area, i.e., vector control, water quality and reduction of hazards.

We appreciate the opportunity to coordinate our mutual environmental interest in this project.

Very truly yours,

William F. Crawford
William F. Crawford
Environmental Impact Coordinator





DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
1114 COMMERCE STREET
DALLAS, TEXAS 75202

February 21, 1975

F.C.	ROUTE
SPEARS	
LEMON	
SULLIVAN	
EVANS	
ELLINGTON	
X DENNIS	C.C.
EDWARD	
OFFICE OF THE REGIONAL DIRECTOR	C.C.
PRESLEY	
PETERS	C.C.
MCGREW	
FILE	W.D.

*Action by:

Our Reference: EI#1274-485

RE: Ozans Creeks Water-shed, Hempstead Cty, Arkansas

Mr. M.J. Spears
State Conservationist
United State Dept. of Agriculture
Soil Conservation Service
Post Office Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

This office has received the Environmental Impact Statement for the above project proposal forwarded for our review in accordance with Section 102(2)(C) of Public Law 91-190.

No dislocations will be required by this project. Other Public Health concerns associated with such projects include the potential possibility for increased breeding and harborage of insect vectors having health consequences. However, the construction plans and actions will prevent and/or reduce this potential to a minimum. Accordingly, we find no aspects of this project proposal that are objectionable from our environmental health standpoint.

We appreciate the opportunity to coordinate our mutual environmental interest in this project.

Very truly yours,

William F. Crawford
Environmental Impact Coordinator



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS (G-WS/73)
U.S. COAST GUARD
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

REC'D	ROUTE
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EDWARDS	
C. RUSSELL	✓
PRESLEY	
PETERS	
McGREGOR	
FILE	Dennis
*Action by:	

FEB 24 1975

Mr. M. J. Spears
State Conservationist
Soil Conservation Service
P. O. Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

This is in response to your letter of 23 December 1974 addressed to Commandant, U. S. Coast Guard concerning a draft environmental impact statement for the Ozan Creeks Watershed, Hempstead County, Arkansas.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

R. I. PRICE
Rear Admiral, U. S. Coast Guard
Chief, Office of Marine Environment
and Systems



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

SEARCHED INDEXED SERIALIZED FILED
CIVIL WORKS
JUN 16 1975
89223

Deputy Administrator
Water Resources

13 MAR 1975

3/24 Klein
Control No. Y27

Ok - 89223

Referred to: SCS

Date:

D MAR 24 1975

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the views of the Secretary of the Army were requested for the Watershed Work Plan and Draft Environmental Statement for Ozan Creeks Watershed, Hempstead County, Arkansas.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department.

The draft environmental statement is considered to be satisfactory.

Sincerely,

Charles R. Ford
Deputy Assistant Secretary of the Army
(Civil Works)



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-75/10

APR 11 1975

Rec'd	3	ROUTE
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ITEM		
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2 VZ 20 ✓ CR. *Denimo*

Dear Mr. Spears:

Thank you for your letter of December 23, 1974, requesting our views and comments on the draft environmental statement and work plan for the Ozan Creek Watershed, Hempstead County, Arkansas. Comments on both documents are presented below.

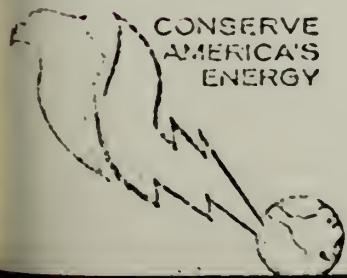
Work Plan

The proposed action will not adversely affect any existing or proposed unit of the National Park System, nor any site eligible for registration as a National Historic, Natural, or Environmental Education Landmark.

An examination of library and file data, without benefit of a field investigation, revealed that during 1974 mineral deposits in Hempstead County yielded sand and gravel, clays, and petroleum, the value of which is withheld to avoid disclosing company confidential information. Within the watershed and its nearby surroundings, known mineral resources include clays, sand and gravel, green sand (glauconitic sand), chalk, marl, and ilmenite. Production to date from the watershed, however, has been limited to sand and gravel. Petroleum is produced some distance south of the watershed near the Lafayette County border. No pipelines are known to traverse the area.

Both documents report on the existence of mineral resources in the watershed (Work Plan, page 6, and Environmental Statement, page 15) and recognize that clay, shale, chalk, and marl have potential for commercial development. Both documents further recognize glauconitic sands and ilmenite as a noncommercial resource. However, neither document actually describes the effect of the project on these mineral resources.

CONSERVE
AMERICA'S
ENERGY



APPENDIX C

Save Energy and You Serve America!

We find that the watershed work plan provides insufficient mitigation for wildlife losses attributed to the project. When our report of March 11, 1970, was prepared, we were informed that the project would result in the loss of about 1,000 acres of bottomland hardwood habitat in the flood plain. However, the last sentence on page 46 of the draft statement indicates that about 4,300 acres of woodland will be destroyed by land use changes due to construction of the proposed project. Because the project will result in a loss of woodland habitat which is far larger than that envisioned when the Fish and Wildlife Service prepared its 1970 report, we believe that the project should be re-evaluated with a view towards mitigating some of the project-caused wildlife losses. Personnel of our Fish and Wildlife Service will be pleased to cooperate with the Soil Conservation Service in this effort.

The work plan (page 32, paragraph 4) states that recreational use could occur at the floodwater retarding structures but will not be provided for the following reasons: (1) public use would result in a reduction of the overall water quality at the structures; and (2) not allowing such public use would minimize the adverse effects of the project. In our view, public use of the proposed reservoirs for hunting, fishing, and other types of recreation should not have a significant adverse effect on water quality or the environment. The Department's Fish and Wildlife Service has responsibility for recommending that public-use facilities be provided at Federal water development projects of this type. In keeping with this responsibility and stated recommendations of the Committee on Government Operations contained in the October 21, 1971, House Report No. 92-586 entitled, "Public Access to Reservoirs to Meet Growing Recreation Demands," we recommend that adequate provisions for public access to all flood-water retarding structures be considered.

A definition of the proposed "Modified Fencing Program" should be provided, page 36, paragraph 3, last sentence.

The table on page 50 of the projected land use of the flood plain without and with the project indicates that 608 acres of grassland will be converted to cropland with the project and that there will be no other net change in land-use acreages. This data conflicts with land-use change discussions contained in the environmental impact statement on page 31 and should be revised accordingly.

A statement is made on page 50, first full paragraph, that, "The conversion of 536 acres of grassland, 301 acres of woodland, and 19 acres of cropland to spillways, embankments, and reservoirs will not affect any critical wildlife value." Although the supply of these habitats is not yet critical, the area does provide habitat for numerous birds and animals; therefore, the wildlife values of these areas should be acknowledged.

We believe that the acreage that has received treatment and the percentage of completion would be more meaningful than the cost of each item. A fish and wildlife management area costing \$300 is itemized on page 60; however, no mention of the benefit of this measure is made in the fish and wildlife and recreation discussion on page 51.

Draft Environmental Statement

The comments on the preliminary draft EIS provided the State Conservationist by the Department's Fish and Wildlife Service, on October 11, 1974, are not adequately discussed. Consequently, many of the errors of the preliminary draft have been carried over to the draft EIS.

Although land-use requirements for structures, the miles of streams inundated, and the adverse effects of sedimentation during the construction period are adequately summarized, the Summary of Environmental Impact and Adverse Environmental Effects does not leave the reader with an accurate understanding of project-induced land-use changes and their effects on wildlife resources. The major land-use changes mentioned elsewhere in the statement should be addressed in the summary on page i. The last sentence on page 46 indicates that about 4,300 acres of woodlands will be converted to agricultural production. The summary should include this loss of bottomland hardwood wildlife habitat.

Page 4, paragraph 4, contains a very impressive discussion on development of productive wildlife habitat and the installation of protective fencing to help reduce adverse impacts. The statement should include a discussion of how plans to manage forest habitat will be implemented and what commitments will be required from local sponsors.

An archeological survey by a competent professional archeologist should be conducted over all areas to be affected by the project (procedures of 36 CFR 800). Therefore, we strongly recommend that an archeological survey be completed for Structure 22 or the structure not be built (page 8, last paragraph). If the landowner desires this reservoir, then he must allow archeologists to survey the project area.

The final statement should contain evidence of review (pages 27-29) of the project by the State Historic Preservation Officer and include comments from that source relevant to the effect of the proposed actions upon historical and archeological resources. We note the draft statement has been sent to the State Clearinghouse and this should include distribution to the Historic Preservation Officer. If it does not, his address is:

Arkansas Historic Preservation Program
Old State House
300 West Markham
Little Rock, Arkansas 72201

In response to page 10, paragraph 1, the Department's National Park Service has requested funding for salvage excavation. However, if these funds are not appropriated, the Soil Conservation Service would be responsible for contracting the required action, using project or other funds.

The report, page 24, paragraph following Tabular Data, states that, "About 3,300 acres of flood plain are inundated for short durations in the spring," but that, ". . . duration is too short to classify the acreage as Type 1 wetlands (seasonally flooded flats)." However, on pages 32 and 33, frequently damaging floods are listed for the various reaches. Furthermore, these areas receive

/sufficient water in both the spring and fall and winter to support waterfowl use during the spring and fall waterfowl migrations. Therefore, these areas should be classified as Type I wetlands.

As stated in our letter of October 11, 1974, on the preliminary draft environmental statement, deer will not "benefit" from the land changes listed, i.e., upland woodland to pasture, bottomland woodland to soybeans, native to improved pasture, hardwood pine to pine hardwood (page 36, paragraph 3).

Flood duration data provided for Reaches II and III (page 36, paragraph 4) should also be provided for the more flood-prone Reaches I and IV.

The statement is made on page 37, first paragraph, under Environmental Impact, that all needed land-treatment measures will be installed on 6,100 acres of forest land. The tree species to be planted should be identified.

We find that significant effects on water resources have been considered and are briefly discussed. In addition, erosion and flooding have received attention commensurate with the seriousness of the problems. In general, the project will probably not have any adverse long-range regional effects on the occurrence and availability of water but may show noticeable effect on water quality due to the increased use of fertilizers and pesticides and increased human activity.

Two items that should be given more treatment are the effects on water quality and ground-water recharge. Reservoirs and wet channels offer additional opportunity for recharge. We disagree that bottom release from reservoirs will not affect water quality downstream, as stated on page 39. U.S. Geological Survey Water-Supply Paper 1998 provides additional information on water resources of the area.

The first paragraph on page 41 states that, ". . . agricultural production on new land is not a primary purpose of the project;" however, the last sentence on page 46 states that about 4,300 acres of woodlands will be converted to agricultural production. This amounts to

clearing almost 38 percent of the flood plain which, in our view, is a significant increase in agricultural land as a result of the project. We feel that the adverse effects such extensive clearing would have on the big game and upland game resources should be addressed in the land-use discussion.

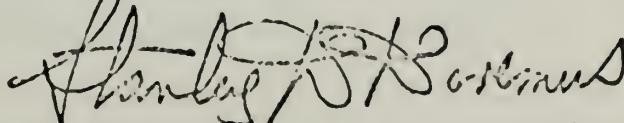
In the discussion of alternatives (page 44, last paragraph) flood plain zoning or restricted land use is somewhat summarily dismissed for rural agricultural lands but recognized as viable and reasonable (along with flood insurance) in urban areas. The statement is also made that the probability of implementation of one of these alternatives is remote and that, "A project to preserve the woodlands in the lower part of the watershed as a fish and wildlife development would require a sponsor willing to assume any local obligations which might be incurred. Presently no sponsor is available for this type project."

Our comments on this matter are that all Federal agencies should make every effort to insure that fish and wildlife mitigation measures are an integral part of any publicly financed project which will cause the loss of fish and wildlife resources. We recommend that further efforts be expended towards developing a program to preserve these woodlands.

It is stated on page 48, third paragraph, that "The 250 acres of critically eroding areas on which land stabilization measures will be installed will be removed from production or beneficial uses for a maximum of 15 years." Elsewhere, the treatment of 250 acres of critically eroding land is accorded merit for the development of desirable wildlife habitat. The phrase, "beneficial use" should therefore be deleted from the first statement.

We hope these comments will be of assistance to you in preparing your final documents.

Sincerely yours,



Secretary of the Interior

Deputy Assistant

Mr. M. J. Spears
State Conservationist
Soil Conservation Service
Department of Agriculture
Post Office Box 2323
Little Rock, Arkansas 72203



United States Department of the Interior
FISH AND WILDLIFE SERVICE
17 EXECUTIVE PARK DRIVE, N. E.
ATLANTA, GEORGIA 30329

AIRMAIL

OCT 11 1974

RECD. 10/11/74
SPEARS
LEMON
SWENSON
EVANS
SULL.V *L. A. S.*
EDWARD
DENNIS *260*
PE. H.
McG.
ELLIOTT
FILE
"Action by:

Mr. M. J. Spears
State Conservationist, Soil
Conservation Service
P.O. Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

This is in response to your September 24, 1974, letter requesting our comments on the preliminary draft environmental impact statement for the Ozan Creeks Watershed project, Hempstead County, Arkansas. We appreciate your granting additional time for our agency's review, and we sincerely hope our comments will be of assistance to your planning staff.

We are pleased to note that the Fish and Wildlife Service and Arkansas Game and Fish Commission's recommendation to delete certain channel work from the project plans has been adopted by your agency.

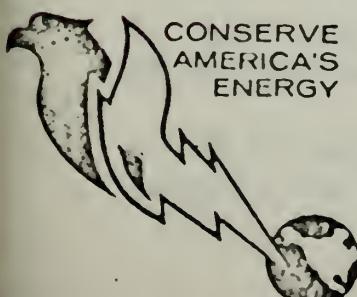
In general, we believe the environmental statement should more thoroughly describe project plans, fish and wildlife resources, environmental impacts of the project, and alternatives. The lack of specific information regarding fish and wildlife aspects of the project does not permit an objective evaluation of the project.

Our specific comments are as follows:

PLANNED PROJECT

Pages 3 and 4

It is stated on page 3 that mains, laterals, and field drains will be installed by landowners on wet bottom-land soils, and on page 4 it is stated that landowners and operators will be encouraged to manage many odd areas and wetlands as wildlife habitat. It appears questionable if wetland wildlife would be preserved under such a program.



APPENDIX C

Save Energy and You Serve America!

Page 5, paragraph 1

The tree species to be planted and their location with respect to existing woodlands should be presented.

Page 5, paragraph 2

The tree species, age classes, and approximate number of trees affected by the practices of improvement cuttings, tree release, and cull removal should be included in the description of this measure.

Page 6, paragraph 1

The statement indicates trees will be retained in the upper ends of the sediment pools for fish habitat. The final environmental statement should include the approximate acreage of timber to be retained in the sediment and flood pool areas of each reservoir. A description of woodland tree species affected by the proposed structural measures should also be included in this section, along with a description of the wildlife habitat value of the affected woodland.

ENVIRONMENTAL SETTING

Page 20; paragraph 1

An investigation should be made to determine if all or portions of the 3,300 acres of flood plain inundated for short durations in the spring are Type 1 wetlands. Wetlands of this type are of high value to migrating waterfowl.

Page 22, paragraph 2

A publication should be cited for the four listed endangered species. These species may be found in the U.S. Department of the Interior's publication "United States List of Endangered Fauna."²

PROBLEMS

Page 29, paragraph 3

The statement that deer benefit from the conversion of upland cropland and woodland to pasture or pine plantations, bottom-land woodland to

1. U.S. Department of the Interior, Fish and Wildlife Service. "Wetlands of the United States," Circular 39. Issued 1956. Reissued 1971.

2. U.S. Department of the Interior, Fish and Wildlife Service. "United States List of Endangered Fauna," May 1974.

cropland, native pasture to improved pasture, and hardwood-pine to pine-hardwood is erroneous. From the list of species discussed, only the bobwhite and rabbit stand to gain from such land-use conversions.

Page 30, paragraph 1

The statement, "These hunting, fishing, and recreation resources surrounding the watershed decrease the importance or need for developing such resources," is questionable. We do not believe that the need for developing and preserving wildlife habitat should be minimized. Fish and wildlife habitat within the watershed should be preserved and developed to its maximum productivity to satisfy the consumptive and nonconsumptive demands placed upon this resource.

ENVIRONMENTAL IMPACT

Page 30, paragraph 5

A complete description of the environmental impact of various proposed land-treatment measures presented in the Planned Project portion of the environmental statement should be presented, including the impact of brush management and weed control.

Page 32; paragraph 2

The description of the revegetative and fencing measures associated with critical area planting should mention the plant species to be established. Insufficient data are presented to permit an evaluation of the wildlife habitat potential.

Page 36

There is little or no evidence within the environmental statement to support items 11, 12, 13, 14, or 20.

ADVERSE ENVIRONMENTAL EFFECTS

Page 37

The statements in this section are too general. A discussion should be presented to fully describe the adverse effects that will occur as a result of project plan implementation. A thorough discussion should also be given on the adverse effects that will occur to the endangered species listed on page 22 of the statement.

ALTERNATIVES

Pages 37-39

Although several viable and reasonable alternatives are considered within this section, additional nonstructural alternatives warrant consideration. These alternatives should include flood plain zoning, acquisition of flood prone areas, flood insurance, flood proofing measures, or other less environmentally destructive courses of action. In conjunction with these alternatives, a resource and development project measure or an agreement with the project sponsor should be formulated to retain woodland portions of the lower flood plain in their natural state. Some mention is made of the environmental impact for the alternative, "Conservation land treatment measures only," but a thorough discussion is needed to describe the impact of all alternatives.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Page 39, paragraph 2

Land-use conversions discussed in this paragraph are in conflict with the projected land uses contained in the table on page 34. The table shows a loss in grassland and no change in forest or miscellaneous land uses.

Page 39, paragraph 3

The source of irrigation water within the project area should be identified.

Sincerely yours,

Herne H. E. Black

Regional Director



United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

H34-PR

*Tom
Let's discuss,
JDD*

SEP 5 1975

REC'D	ROUTE
SPEARS	71195
DAVIS	
PRESLEY	
EVANS	
THOMAS	220
EDWARDS	
CAMPFIELD	PPC
ELLINGTON	
PETERS	
McGOWAN	
WILSON	
FILE	

*Action by:

Mr. M. J. Spears
State Conservationist
United States Department of Agriculture
Soil Conservation Service
P.O. Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

Thank you for your request for a determination of eligibility for inclusion in the National Register on 32 archeological sites (3HE115-3HE144 and 3HE40-3HE41) in the Ozan Creeks Watershed, Hempstead County, Arkansas, pursuant to section 800.4(a)(2) of the procedures of the Advisory Council on Historic Preservation for compliance with the National Historic Preservation Act of 1966 and Executive Order 11593.

After evaluation of the documentation which we have on the above properties and in consultation with the Arkansas State Historic Preservation Officer, we have determined that these 32 archeological sites are eligible for inclusion in the National Register of Historic Places under criterion (D) of the National Register criteria for evaluation. This area of Arkansas is not well understood in terms of prehistoric cultures and any scientific investigation undertaken in these areas will undoubtedly contribute to our knowledge of Arkansas prehistory.

The conditions under which the initial surveys were conducted were, according to the archeologists involved, far from ideal, due to the heavy ground cover in this part of Arkansas. It is therefore expected that clearing operations will uncover more archeological sites within the Ozan Creeks Watershed project area. We recommend that the Soil Conservation Service (SCS) have an experienced archeologist on hand during these clearing operations to evaluate any newly discovered sites so that proper excavation can be undertaken without causing undue delay to your agency's project, especially for Reservoirs 2-5, 8, 13, 15 and 18, where no sites were found, and Reservoir 22, which the archeologists were unable to survey.



APPENDIX C

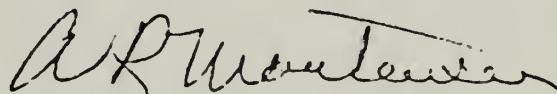
Save Energy and You Serve America!

We have been advised that the Arkansas State Historic Preservation Officer and the Arkansas Archeological Survey consider the entire Ozan Creeks Watershed to be eligible for inclusion in the National Register as a district. Although the boundaries proposed to the State include more than the watershed project area with which the SCS is presently concerned, this determination includes only those areas surveyed under the Soil Conservation Service contract. If the SCS is involved in a project in this area in the future, we recommend that you undertake complete archeological, architectural, and historical surveys to determine the full extent of such resources in this area.

As you understand, a request for our professional judgment pursuant to the Advisory Council's procedures in this regard, developed in consultation, *inter alia*, with the Department of Agriculture, constitutes a part of the Federal planning process. We urge that this information be integrated into the National Environmental Policy Act analysis to permit the Soil Conservation Service to reach the most effective program decisions. This determination of eligibility for inclusion in the National Register does not serve in any manner as a veto to uses of such property, with or without Federal participation or assistance. Any decision on the project in question and the responsibility for program planning concerning these properties lies with the Soil Conservation Service, after the Advisory Council on Historic Preservation has had an opportunity to comment.

We appreciate your assistance and cooperation in the implementation of Executive Order 11593.

Sincerely yours,



Director, Office of Archeology
and Historic Preservation

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 450
Washington D.C. 20005

Mr. M. J. Spears
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P. O. Box 2323
Little Rock, Arkansas 72203

REC'D	ROUTE
SPEARS	1
LEMON	1
X SULLIVAN	
EVANS	
ELLINGTON	
X DENNIS	✓ 28Q
EDWARDS	
C. RUSSELL	CL
PRESLEY	
PETERS	
McGRIEW	
FILE	RECD

JAN 28 1975

*Action by:

Dear Mr. Spears:

This is in response to your request for comments on the draft environmental statement (DES) and draft watershed work plan (WWP) for Ozan Creeks Water-shed, Hempstead County, Arkansas. The Advisory Council has reviewed these documents and has determined that Soil Conservation Service (SCS) has satisfactorily demonstrated compliance with Section 106 of the National Historic Preservation Act of 1966, with respect to this undertaking.

However, the Council also notes on page 20 of the WWP and on page 28 of the DES that "sites in the Ozan Creeks area should...contain significant archeological information badly needed for socio-cultural reconstruction of the indigenous populations of southwest Arkansas." Based on this information, it would appear that many of the archeological sites, located during the survey and identified in the DES and WWP as being impacted by this project, meet the criteria for inclusion in the National Register of Historic Places.

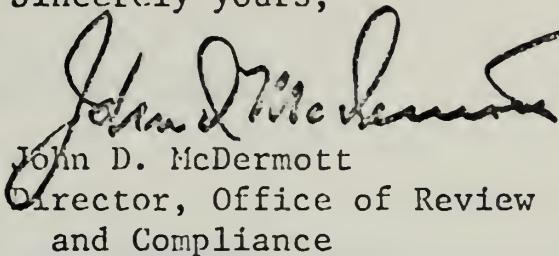
Therefore, in accordance with Section 800.4(a)(2) of the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), (copy enclosed), which set forth steps for compliance with Executive Order 11593, "Protection and Enhancement of the Cultural Environment" of May 13, 1971, the Council requests that the SCS request, in writing, an opinion from the Secretary of the Interior with respect to these properties' eligibility for inclusion in the National Register and inform us of the findings.

The SCS is reminded that should this evaluation result in a determination by the Secretary of the Interior that these properties are eligible for inclusion in the National Register, it is required to afford the Council an opportunity to comment on this undertaking pursuant to Section 800.4(e) of the procedures.

APPENDIX C

Should you have questions or require additional assistance, please contact Michael H. Bureman of the Council staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946.

Sincerely yours,



John D. McDermott
Director, Office of Review
and Compliance

Enclosure



STATE OF ARKANSAS
DEPARTMENT OF PLANNING
400 TRAIN STATION SQUARE • VICTORY AT MARKHAM
LITTLE ROCK 72201

DAVID PRYOR

GOVERNOR

CHARLES T. CROW

DIRECTOR

M E M O R A N D U M

TO: State Planning and Development Clearinghouse

FROM: Charles T. Crow *DP*

SUBJECT: Ozan Creeks Watershed - Draft Environmental Impact Statement

DATE: January 21, 1975

The proposed Ozan Creeks Watershed is located in Hempstead County, Arkansas, and will provide watershed protection and flood prevention by application of conservation land treatment measures and installation of land stabilization measures on 250 acres and 22 floodwater retarding structures. Average annual acres flooded will be reduced 25 percent on 11,426 acres.

Investigation indicates the Draft Environmental Impact Statement adequately addresses all environmental factors. The Arkansas Department of Planning has no comments regarding this project.

CTC/mrt

February 5, 1975

Mr. Norman F. Williams, Director
Arkansas Geological Commission
3819 West Roosevelt Road
Little Rock, Arkansas

Re: Ozan Creeks Watershed Draft Work Plan and Draft EIS

Dear Mr. Williams:

We have reviewed the report referenced above. The Draft EIS seems to satisfy NEPA guidelines and the Draft Work Plan appears to be well written.

The flood protection and land treatment measures would benefit the area both economically and environmentally.

Sincerely,

John P. Saxton
Director

JPS:ADF:cc

cc: State Planning and Development Clearinghouse

APPENDIX C

ARKANSAS STATE DEPARTMENT OF HEALTH
4815 WEST MARKHAM STREET
LITTLE ROCK



December 31, 1974

Mr. John Saxton, Director
Soil & Water Resources Division
1920 W. Capitol
Little Rock, Arkansas

Re: Ozan Creeks Watershed
Draft Environmental Impact Statement
Draft Work Plan
75 E 356

Dear Sir:

We have reviewed these documents and there are no apparent items which would be detrimental to the public health. Therefore, no comments will be submitted.

Yours truly,

BUREAU OF CONSUMER PROTECTION SERVICES

G. T. Kellogg
G. T. Kellogg, P.E., Director
Chief Engineer

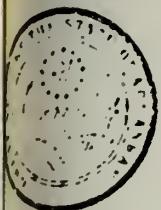
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JAN 15 1975

SOIL AND WATER
CONSERVATION COMMISSION

APPENDIX C



ARKANSAS DEPARTMENT OF PARKS & TOURISM
PARKS DIVISION

1510 Broadway Little Rock, Arkansas 72202 Telephone (501) 371-1633

Jack E. Miller
Director of State Parks

Dale Bumpers
Governor /
William E. Henderson
Director

February 11, 1975

Mr. John Saxton
Chairman, Technical Review Com.
1200 Westpark Drive, Room 308
Little Rock, Arkansas 72204

Re: Ozan Creek.

Dear Mr. ~~Saxton~~:

Enclosed is a copy of a staff memorandum concerning Ozan Creek. We have reviewed the plan and, while we have no objections, we offer the enclosed comments for the Soil Conservation Service's consideration. Thank you for the opportunity to comment.

Sincerely,

Sam Biles

Gary Bolin
Environmental Planner

GB:mc
Enc:

RECEIVED

FFR 131975

SOIL AND WATER
CONSERVATION COMMISSION

APPENDIX C



ARKANSAS DEPARTMENT OF PARKS & TOURISM PARKS DIVISION

Bumpers · 1510 Broadway Little Rock, Arkansas 72202 Telephone (501) 371-1633

OUACHITA REGIONAL HEADQUARTERS

Suite 004 Meyer Building Hot Springs, Arkansas 71901

Jack E. Miller
Director of State Parks

C. G. Barton
Supervisor

MEMORANDUM

TO: Gary Bolin

FROM: John Woods

DATE: February 7, 1975

OBJECT: Review of Ozan Creek's Watershed Work Plan and Environmental Impact Statement

here is a good summary of the plan starting on page 1 of the Work Plan. The plan consists of two basic improvement measures to be performed within the watershed. The alternatives are listed on page 32 and 33 of the Work Plan. The two improvement measures are as follows.

Land Treatment Measure.

The entire watershed will be subject to accelerated land treatment measures. The program will be based upon the use of each acre of land within its capabilities and treatment in accordance with its needs. The use of sound land management will be encouraged through the use of conservation cropping systems, proper drainage systems, fertilization, liming, proper tillage, crop residue management, proper grazing, brush management, weed control, and seeding additional grasses and legumes. Total cost of the measure is \$654,300.

Structured Measures.

This measure consists of building 22 flood water retarding structures and approximately 250 acres of land stabilization measures. Total cost of this measure is \$3,550,300. The dams will be earthfill structures with vegetated emergency spillways to convey runoff. The pools at the crest of spillways will inundate 664 acres. An additional 835 acres will be subject to temporary inundation in the floodwater detention pools.

This is a short summary of what is to be completed within the year installation period. The Hempstead Soil and Water Conservation District is the sponsoring local organization.

Comments:

The way they plan to implement the land treatment measures is adequate.

an Creek

age 2

February 7, 1975

2. I feel there are too many structures planned. Almost every tributary has a dam on it.
3. The impoundments will be owned by the landowners and public access to the ponds will be left up to landowners. If access is provided, sanitary facilities are required.
4. They include increased fish population as a benefit but only a very small percentage of the populus in the area will be able to realize the benefit.
5. They do admit that recreation will be very limited. Read page 42 in the work plan.
6. A total of 24 archaeological sites were located in the reservoir areas during the archaeological survey and will be affected by installation of the project. The Secretary of the Interior will be notified of these sites and is responsible for salvage of the sites. The plan points out the importance of these sites but does not say how or when they are to be salvaged. The Arkansas Archaeological Survey will be requested to make an additional investigation after clearing operations have been completed. Definite plans for salvaging of the sites should be included in the plan.

The plan appears to be beneficial for the landowners and the resource in general; however, the general public will realize very little benefit as far as recreation is concerned. Not enough emphasis is placed on salvaging of the archaeological sites which will be inundated.



STATE OF ARKANSAS

DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

8001 NATIONAL DRIVE
LITTLE ROCK, ARKANSAS 72209501 371-1701 GEN. OFF.
501 371-1136 AIR DIV.

MEMORANDUM

TO: Mr. John Saxton, Chairman
Technical Review Committee

FROM: Trusten H. Holder T.H.H.

DATE: February 26, 1975

SUBJECT: OZAN CREEKS WATERSHED

The Draft Environmental Impact Statement and Draft Work Plan for the Ozan Creeks Watershed have been reviewed by this Department. Our chief concern, regarding this project, pertains to what we consider to be a basic weakness in the 566 Program.

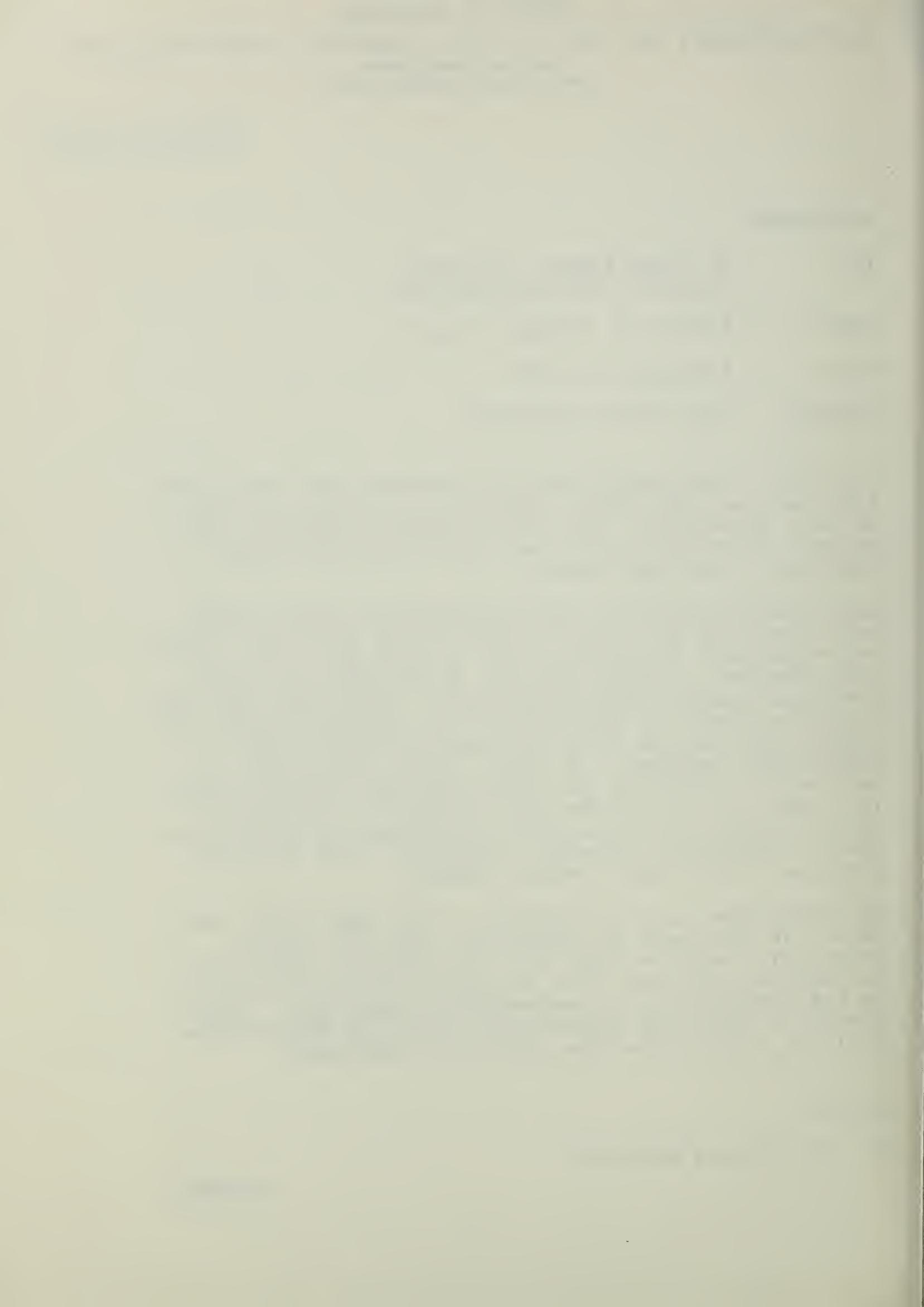
Beginning on page 2 of the Environmental Impact Statement, and also at various places in the Work Plan, there are references to environmental enhancement land treatment measures. These measures, if actually put into practice, would be very beneficial. We realize that the landowners "will be encouraged" to expend the money and effort necessary to carry out these environmental enhancement measures. We wish, though, that there was some way of obtaining the same assurance and permanancy for those practices which would benefit wildlife and other elements of the natural environment as exists for the 22 floodwater retarding structures which are also proposed for the Ozan Creeks Project.

Our Department is not objecting to the Ozan Creeks Project. We wish only to emphasize a need for closer cooperation between those who are primarily interested in flood control and those who are primarily interested in the preservation of environmental qualities. Maybe through a genuinely cooperative effort the 566 Program could be improved for the benefit of everybody.

THH/bb

cc: Mr. Armand DeLaurell

APPENDIX C



ARKANSAS GAME AND FISH COMMISSION
February 27, 1975

TO	INFO
SAXTON	
SKYTHARSKI	
CANTRELL	
FORREST, J. M.	
YOUNGS	
SWANSON	
LE GUSIN	
WHITE	
STEPHENS	
WILSON	
GILSON	

MEMORANDUM TO: John P. Saxton, Chairman,
Technical Review Committee

FROM: Richard W. Broach, Member
Technical Review Committee

This is responsive to a memorandum from the State Planning and Development Clearinghouse of December 26, 1974 concerning the Ozan Creeks Watershed Draft Environmental Impact Statement and Draft Work Plan.

We are enclosing a letter dated Oct. 23, 1974 from this Commission to the U. S. Soil Conservation Service in which we recommended certain steps to be taken in order to lessen the project damage. In reviewing the Draft Environmental Impact Statement and Work Plans, we note that none of our recommendations have been followed. This Draft E.I.S. should be found inadequate in the absence of measures to lessen project-induced damages to environmental and wildlife values.

RWB:ac
Enc.

cc: State Planning & Development Clearinghouse

U. S. Fish & Wildlife Service, Vicksburg

MAP 41975

SOIL AND WATER
CONSERVATION COMMISSION

JOE D. SCOTT
CHAIRMAN
NASHVILLE

RALPH B. GRIFFIN
VICE CHAIRMAN
JONESBORO

R. A. NELSON
BLYTHEVILLE

GUY FENTER
CHARLESTON

ALPH H. BOWERS
HARRISON

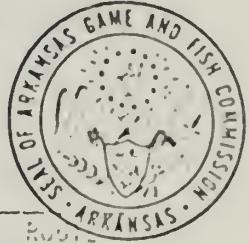
MAEL F. MAHONY
EL DORADO

WM. F. WRIGHT
LITTLE ROCK

P. M. JOHNSTON
FAYETTEVILLE



Arkansas Game and Fish Commission



LITTLE ROCK, ARKANSAS 72201

October 23, 1974

REC'D	4	ROUSE
SPEARS	1	
LEMON	1	
SWENSON	1	
EVANS		
<input checked="" type="checkbox"/> SULLIVAN	1	
EDWARDS		
DENNIS		
PETERS		
McGREW		
ELLINGTON		
FILE		<u>Section</u>

*Action by:

Mr. M. J. Spears, State Conservationist
Soil Conservation Service
P.O. Box 2323
Little Rock, Arkansas 72203

Dear Mr. Spears:

We have reviewed the work plan and Draft Environmental Statement of June, 1974, for the Ozan Creeks Watershed, Hempstead County, Arkansas, and offer the following comments.

Our first observation was that the alternative of flood plain management is not included in the Statement as a method of flood control. Since bottomland hardwood habitat is valuable, both for timber production and as wildlife habitat, as pointed out in my letter of February 26, 1970, we feel that this alternative should be considered.

On page 2, section 3, under Fish and Wildlife, we note that "revegetation of critically eroding and disturbed areas" is an improvement to be undertaken. We recommend re-establishment of broad leaf tree species and other plants which will provide cover and food browse for various wildlife species, rather than pine trees.

This project, as originally conceived to control flooding, provided for channelization features; however, due to recommendations of the U. S. Fish and Wildlife Service and the Arkansas Game and Fish Commission, the channelization project was deleted because of concern for the remaining overflow bottomland forest and associated wildlife. Thus, the upstream floodwater retarding structures were planned. This is a fine example of cooperation between agencies which represent quite different interests.

Mr. M. J. Spears

- 2 -

October 23, 1974

After continuing studies and review we have a few more recommendations on this project:

1. The remaining hardwood habitat in the flood plains of the Ozan Creeks should be retained with its natural vegetative cover through easement arrangement (allowing timber management) and/or acquisition.
2. Provide for public fishing on several of the reservoir sites.

We are mainly concerned about disappearing habitat and associated wildlife resources. The seriousness of the problem is documented by a letter dated September 6, 1974, to this agency from the State Forester, Mr. B. S. Gresham, in which he states:

"The survey figures bear out the fact that in Arkansas we are cutting more hardwood sawtimber volume than we are growing. This is due to much of the better hardwood sites being cleared and the reduction in tree size for hardwood growing stock. This trend will eventually lead to loss of more of the hardwood lumber and veneer operations in many sections of the state."

The survey to which he refers is the U. S. Forest Service Surveys on Forest Resources and Statistics for Arkansas, 1959 through 1969. He also states:

"I feel land clearing for agriculture and pasture purposes, percentage-wise in the past five years, would be greater than the 1959 to 1969 figure indicates."

We do not think our comments on retaining hardwood habitat are inconsistent with the project goals. Throughout the impact statement there are statements which would indicate concern for forest management. On pages 3, 4 and 5, the discussion under Land Treatment Measures, especially the paragraph on page 4 which states: "The Hempstead County Soil and Water Conservation District, the Arkansas Forestry Commission and the International Paper Company will jointly develop a forest land treatment program that will effectively establish and maintain optimal forest productivity and diversity," expresses this concern. The words:

Mr. M. J. Spears

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"optimal forest productivity and diversity", especially the word diversity would indicate the need for hardwood management as well as pine management. In this we concur since hardwoods also provide excellent wildlife habitat.

On pages 16, 17, and 18, under Economics Resources, mention is made of the fact that: "The industrial activity of Hope centers around lumber and wood working industries. Sawmills, both pine and hardwood, represent a chief source of employment." Continuing losses of hardwood may well affect the sawmill industry in Hempstead County.

In view of the foregoing comments as stated in the Draft Environmental Statement for the Ozan Creeks project, it is our opinion that measures to retain the remaining hardwood in the flood plain would be completely consistent with the overall project.

We appreciate the opportunity to offer our comments.

Very truly yours,

Andrew H. Hulsey

Andrew H. Hulsey,
Director



AHH:DGC:ac

cc: U. S. Fish & Wildlife Service,
Vicksburg



